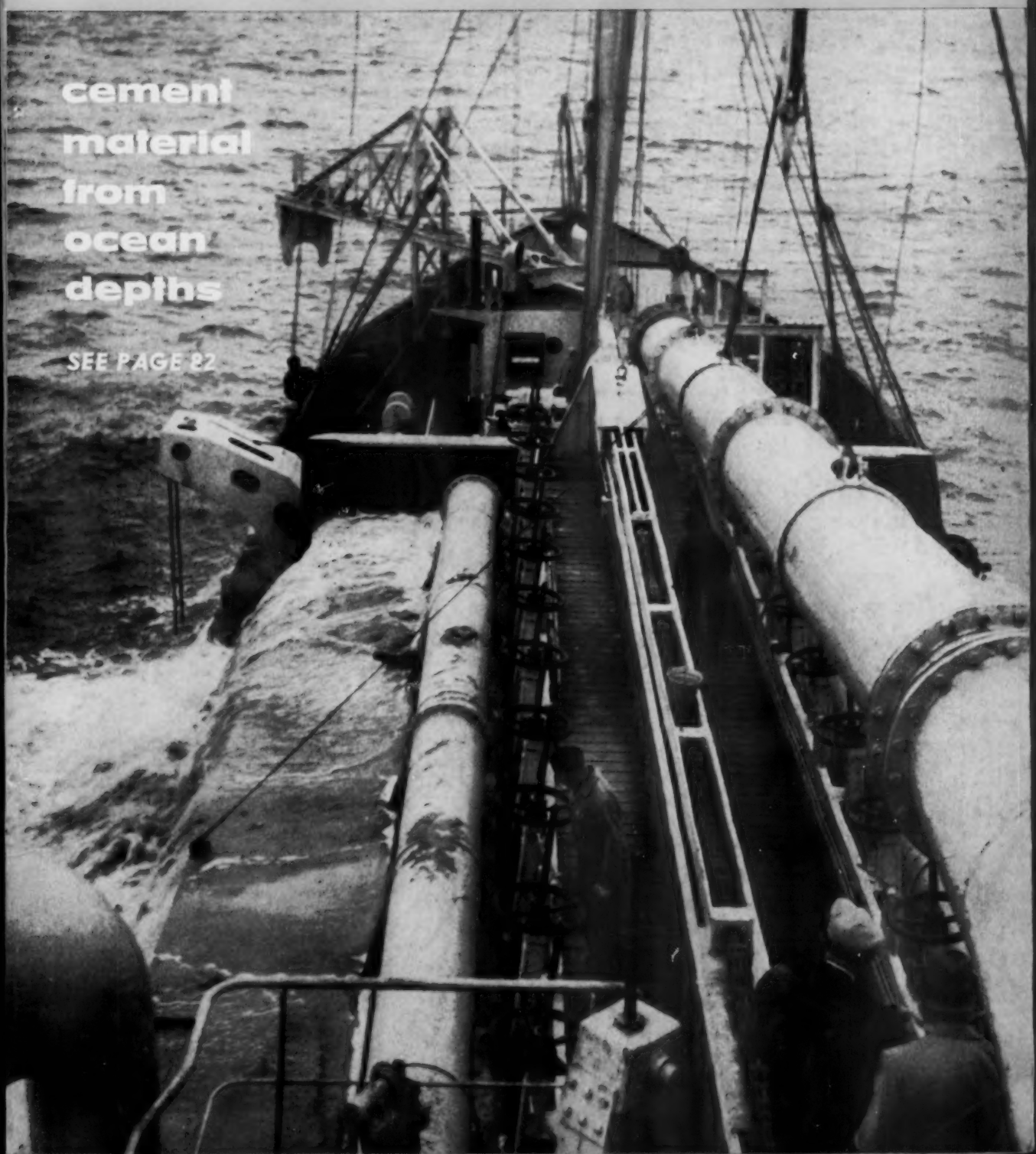
pit and quarry

THE BASIC MAGAZINE IN A BASIC INDUSTRY

february 1961



SEE PAGE 82

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ECONOMICAL

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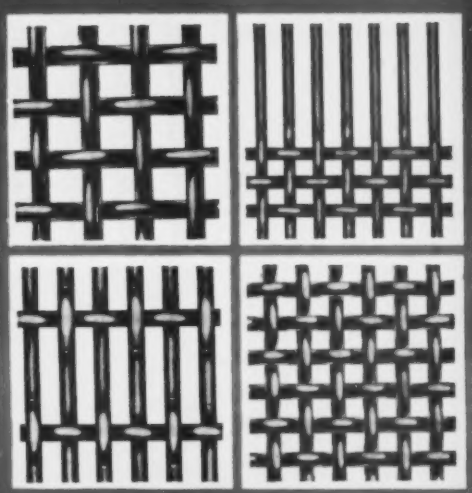

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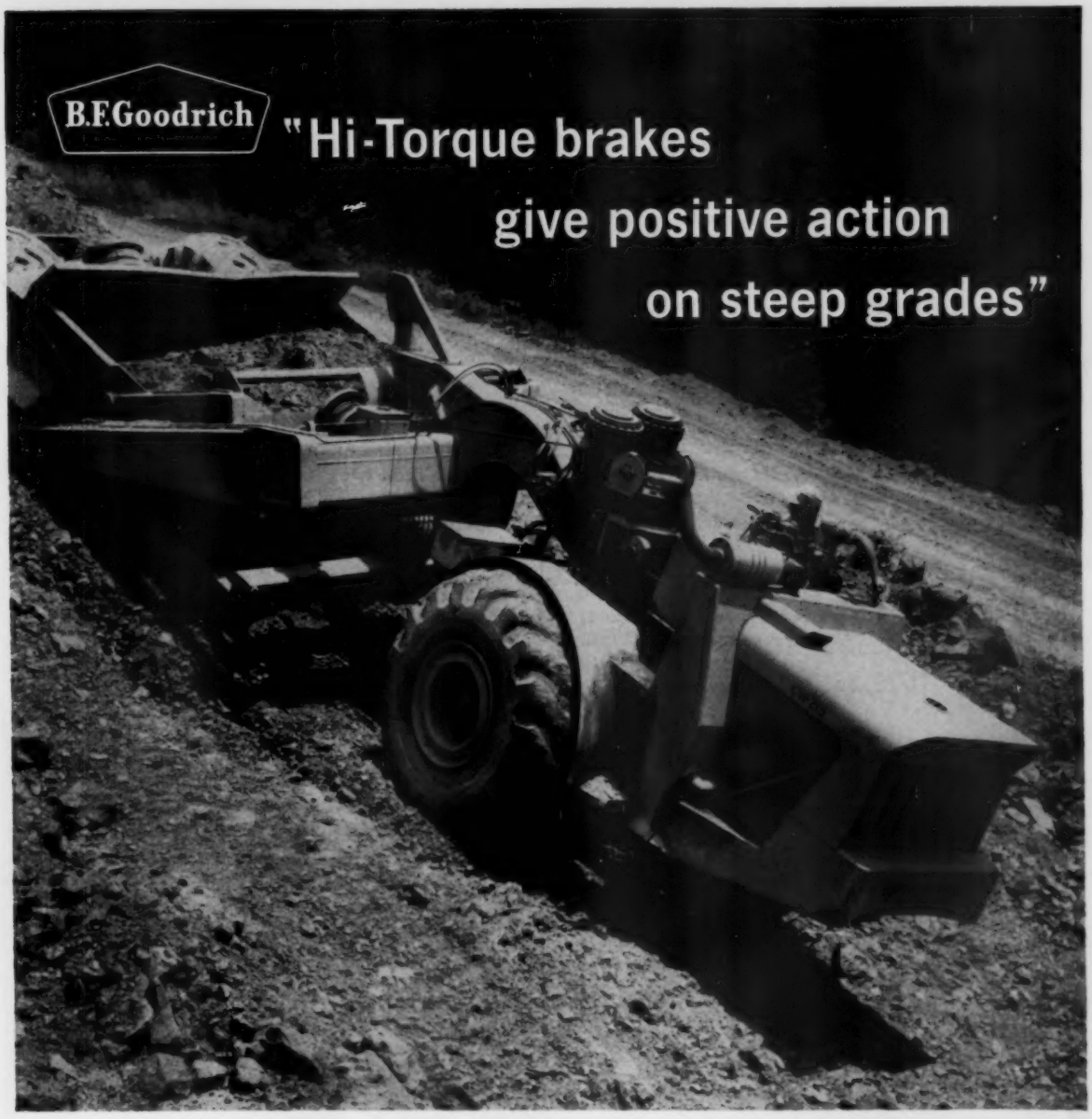
Write for NEW Catalog 104

Ludlow-Saylor Screens and Wire Cloth can be furnished in any steel including SUPERLOY high carbon, LUDLOY oil-tempered, stainless or other alloys; Monel, bronze, copper, brass and most other metals that can be drawn into wire.

Enter Cover 2 on card, page 169

B.F.Goodrich

"Hi-Torque brakes give positive action on steep grades"



This Curtiss-Wright earthmover, equipped with B.F.Goodrich Hi-Torque brakes, is operated over rough West Virginia terrain where brakes must be applied frequently. The contractor reports "positive braking action on steep grades is the outstanding Hi-Torque feature." Gross weight on this vehicle is 32 tons, with payload varying from 44,000 to 50,000 pounds.

Hi-Torque brakes give heavyweight vehicles adequate safety and controllability—stop vehicles in approximately half the distance required for conventional two-shoe brakes. With this reserve braking power, cycle time can be reduced as equipment is operated in higher gear. Operators can tackle grades usually considered unsafe, since Hi-Torque brakes don't fade, will stop a fully loaded vehicle downhill!

Specify Hi-Torque brakes on your equipment — ask the vehicle manufacturer for details. Or write *B.F.Goodrich Aviation Products, a division of The B.F.Goodrich Company, Dept. PQ-2, Troy, Ohio.*

Full circle contact with drum is provided by Hi-Torque brakes giving maximum effective braking surface in the same size unit. Hi-Torque stops vehicles twice as fast as conventional brakes.

B.F.Goodrich Hi-Torque brakes

Enter 1 on card, page 169

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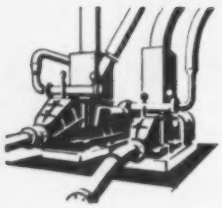
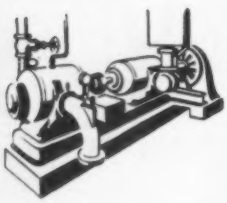
FULLER EQUIPMENT

for the process industries

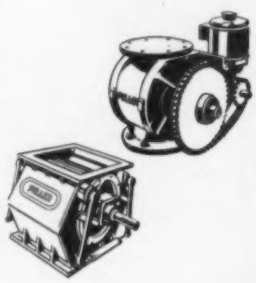


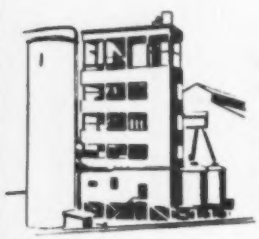
Pneumatic Materials Handling Systems. Widely specified throughout the process industries, Fuller's range of equipment offers best single source for solving problems in moving dry bulk materials pneumatically. Fuller-Kinyon Pumping Systems, Airveyor® Pressure and Vacuum Conveying Systems, and F-H Airslide® Fluidizing Conveyors are completely sealed to prevent both contamination of the product and any leakage of dust, etc., into the surrounding area. They are used to move dry, granular and pulverized materials to and from cars, ships, trailers, storage and processing points.



Fuller Rotary Compressors and Vacuum Pumps are vibration-free, can be installed anywhere, even on balconies. Fewer moving parts mean minimum maintenance. Compressors and Vacuum Pumps handle air and gases from 30 to 3300 cfm at pressures to 125 lb. gage. Vacuums to 29.95 in. (referred to 30-in. barometer).

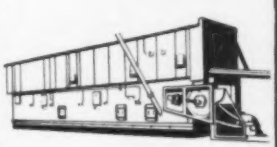
Fuller Vane-type and Roll Feeders . . . for volumetrically controlled feeding of a wide range of dry pulverized or granular materials. Also Fuller Rotary Valves . . . used under silo deck slabs and bins to permit the free flow of pulverized materials which tend to arch, such as lime and cement raw materials.





Fuller Preheaters, Humboldt Suspension Type . . . for preheating dry, pulverized Portland cement raw materials with rotary kiln waste gases.

Fuller Horizontal and Inclined Grate Coolers are compact, easily installed for fast, efficient cooling of materials such as nodulized phosphate rock, pebble lime, ores, dolomite, iron nodules and Portland cement clinker from 2800°F. or higher to any desired point within a reasonable range of atmospheric temperature.



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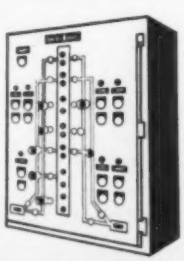
Fuller Control Panels permit automatic, remote, one-man control of multiple operations. Easily-read panel permits visualizing flow of material to storage or from process bins.



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"See Chemical Engineering Catalog for details and specifications."

1356
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PIT and QUARRY

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✓ *Indicates a* PIT AND QUARRY *staff-written report*

Thousands Save on Truck and Tractor Maintenance with Almasol Gear Lubricants

The same ALMASOL Wear-Arresting Agent which originally helped solve problems of high surface temperatures, extreme pressures, and acid corrosion on supersonic jets and space-conquering rockets is now providing ***new dimensions of protection*** for heavy equipment.

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ALMASOL provides a margin of protection far beyond the realm of ordinary gear oil. The Almasol film "takes over" when overheating or overloading creates conditions which would cause oil alone to fail.

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Keeping Ahead of the Crushers

at RIDDLE QUARRIES, INC. SALINA, KANSAS

A policy of working toward *keeping their customers in business* has been largely responsible for the rapid growth of Riddle Quarries, Inc. with headquarters at Salina, Kansas.

Riddle Quarries, Inc. operates in 21 counties in Kansas and three more locations are being considered. The management believes in *keeping modern*.

Here again, from the standpoint of satisfaction with Northwest performance as evidenced by the purchase of 9 Northwests, is testimony to the fact that Northwests are always ready to go. We hear it everywhere, and Northwest users will tell you so.

Northwest design—rugged Cast Alloy Steel Machinery Bases and Machinery Side Frames that eliminate constant rebuilding; Uniform Pressure Swing Clutches, cool-running, jerk-free; the Feather-Touch Clutch Control with its *true* feel of the load; a crowd that brings extra digging force to handling rock, power plants engineered for rock work and many other Northwest advantages combine to give smoother control, greater digging power and longer, trouble-free service.

Your Northwest is always ready to go. If you are considering adding to your equipment it will pay you to bring yourself up-to-date on Northwest's latest advantages.

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POWER IS CONDUCTED
THROUGH THE AIR

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  220/440/550 volt
- 3 PHASE
  on larger models
- 5-YEAR GUARANTEE
- ANTI-MAGNETIC
  SIDE RAILS
  Either type as shown below

- DUST-TIGHT
- WATERPROOF
- COMPACT, RUGGED CONSTRUCTION
- SCREEN CLOTH INSULATION
  On both sides for complete protection

Pat. Appl. for

Flux Power Eliminates Z-Bar Connectors
Use either Plain or Stainless Cloth

This major break-through by HANCO ENGINEERS OFFERS OPTIMUM EFFICIENCY in screening and sizing of moist materials. Replacement of cables and laminated flexible conductors is eliminated.

HANCO HEATER VERSATILITY permits optional location on various types of screens.

HANCO EXTENDS LIBERAL TRADE ALLOWANCE.

For Abrasive Materials

AVAILABLE WITH EITHER TYPE TENSIONING RAIL

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A DIVISION OF HANNON ELECTRIC CO.

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WIBAUTSTRAAT 6
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Here's why you cut your cost/ton specified with *LIPPMANN* vibrating screens

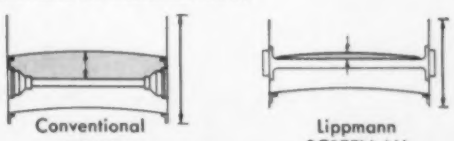
You get sharper sizing action since the entire weight of vibrating body is carried by the shaft. This allows a truly perfect-circle throw, without need for vibration dampening guy cables and springs. And results in maximum tumbling action, greatest particle contact for highest screen efficiency.

You get longer life with lower maintenance costs with SCREEN-ALL hub-mounted bearings. This design feature reduces shaft bending moment to a fraction of that of conventional screens, and permits larger bearing surfaces than on other screens of comparable rating. Further, eccentric hub permits perfect counterbalancing so no fatiguing strains and stresses are transmitted to screen frame.

Shaft bending moment of conventional screen

Shaft bending moment of Lippmann SCREEN-ALL

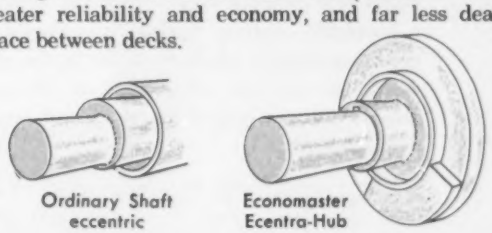
You need less head room. Conventional shaft-mounting wastes space. On SCREEN-ALL, *all four* bearings are mounted *outside* screen body. This permits shaft to be moved up to 8" closer to deck . . . without any sacrifice of material flow.



Conventional screen

Lippmann SCREEN-ALL

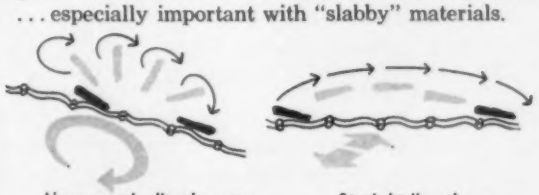
Now, for the first time you can adjust the eccentric throw of a two-bearing screen . . . to compensate for load conditions. With exclusive Ecentra-Hub, eccentric weights are no longer fixed within the shaft, but are now placed on the hub assembly where they are fully adjustable. As a result you get an eccentric action which actually creates throw, and allows you to maintain high screening efficiency over a wide variety of conditions. Also, design permits a two-bearing screen with a uniform cross-section shaft for greater reliability and economy, and far less dead space between decks.



Ordinary Shaft eccentric

Economaster Ecentra-Hub

You get two-way, production-boosting tumbling action. Efficient circular throw, plus action of gravity on inclined screen impart a live tumbling action that gives maximum screen contact to all sides of particles . . . especially important with "slabby" materials.



Lippmann inclined screen with circular throw

Straight line throw of horizontal screens

LIPPMANN
ENGINEERING WORKS, INC.
Milwaukee 14, Wisconsin

Yes, Lippmann makes horizontal screens, too!

Clip and mail for facts . . . Address to: Dept.
LIPPMANN ENGINEERING WORKS, INC., Milwaukee 14, Wisconsin

Please send me details on how I can boost production and cut my screening costs.

I'm interested in .....

Name .....

Company .....

Address .....

City ..... Zone..... State.....

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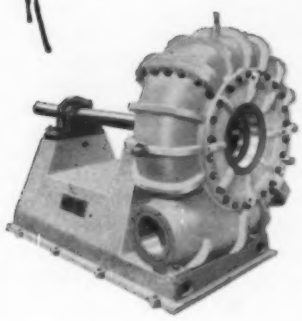
Are You Ready for Spring?

Many THOMAS

DURABLE DREDGE PUMP

Operators Will be Producing
Increased Tonnages of
SAND & GRAVEL
AT LOWER COST



WHEN SPRING ARRIVES

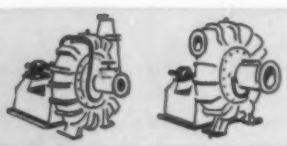
Right now while production in the colder climates is at a standstill awaiting Spring, you should be considering your competitive position. This is the time for you to weigh the proven advantages of Thomas DURABLE Dredge Pumps against the older and less efficient, short lived pumps.

The wearing parts of Thomas Pumps outlast working parts of other pumps by a tremendously wide margin. The users of several hundred Thomas Pumps have been astounded at their long life while pumping very abrasive GRAVEL and SAND.

Not only are they more durable, last longer, more productive, but they are *AVAILABLE*. SHIPMENT OF REPAIR PARTS FROM STOCK AT THOMAS FOUNDRIES IS THE RULE.

If you are tired of waiting for repair parts, tired of making frequent change of parts, think now of getting lined up for the finest production you ever enjoyed when Spring's heavy pumping rolls around.

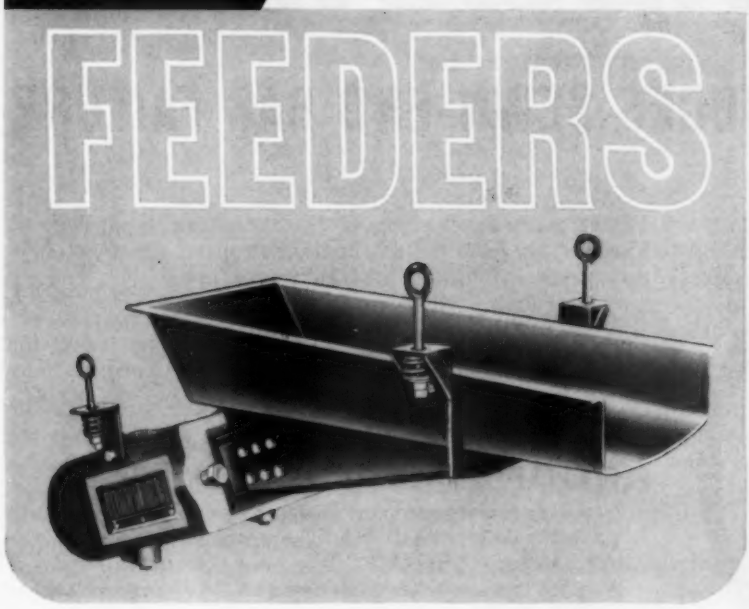
Write, wire, or phone now for full detailed information, including statements of enthusiastic users all over the country. They are using Thomas Pumps from 6" to 16" discharge.



THOMAS FOUNDRIES Inc.
P. O. BOX 1111, BIRMINGHAM, ALABAMA

REDUCE BULK MATERIALS HANDLING COST

SYNTRON VIBRATORY FEEDERS



HEAVY DUTY MODELS—HIGH CAPACITY, CONTROLLED FEEDING

Syntron Heavy-Duty Vibratory Feeders have rated outputs of from 25 to 1000 tons per hour. They are designed to handle a great diversity of materials in a wide range of particle sizes—fine powder to large lumps, damp or dry, hot or cold.

Syntron Vibratory Feeders are plant proven for efficient, accurate, high capacity feeding, spreading, cooling, heating, and drying of bulk materials.

The Syntron electromagnetic drive has few mechanical moving parts, insuring dependability and low maintenance. Magnet and springs are dust tight for longer trouble-free service. Instant control of amplitude permits quick, accurate adjustment of material flow.

Available for floor or suspension mounting with flat pan or tubular trough in sizes to meet every feeding requirement.

Feeding minus 5 inch stone from the primary crusher onto a belt conveyor.

Write for Syntrons' Catalog #605 and the name of the Representative nearest you.

61F5

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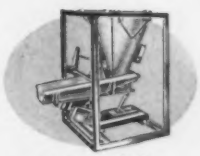
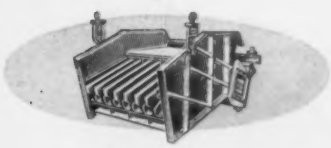
Other SYNTRON equipment of proven dependable quality



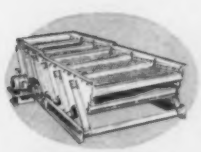
Dry Feeder Machine

Rectifier Power Units

Gasoline Hammers



Grizzly Screens



Mechanical Vibrating Conveyors Screens

SYNTRON

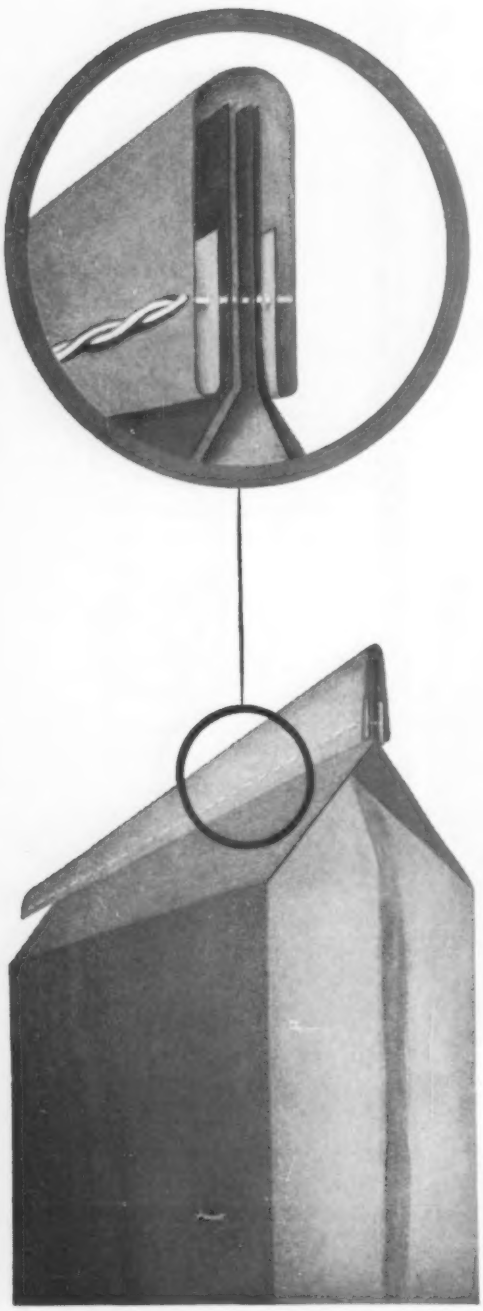
SYNTRON COMPANY

385 Carson Avenue • Homer City, Pa.

ANOTHER TECHNICAL ADVANCE FROM WEST VIRGINIA

NEW ImpacTAPE™

DRASTICALLY REDUCES SEWN-END BAG FAILURE



Pioneer in the development of Clupak* extensible paper, West Virginia now leads the way to a far stronger, tighter, money-saving sewn multiwall through "ImpacTape."

ImpacTape is a revolutionary new type of sewn tape closure** that adds four layers of tape to the sewn end instead of the conventional two. This provides *49% greater toughness* than standard sewn 70-lb. tape closures plus a new "cushioning" against impact shock.

PROOF from actual field trial

A leading cement company had an unusually high sewn valve breakage rate of 1%. They packed a trial shipment of bags, using West Virginia's new ImpacTape. Average breakage rate went down to .3%—a reduction of 70%. Dollar savings from reduced breakage will far exceed the small upcharge for the new closure.

PROOF from new testing technique

The development of ImpacTape was hastened by West Virginia's successful adoption of the Impact Resistance Tester to measure sewn end toughness under conditions of sudden shock. It represents the only sewn closure test devised thus far which bears a predictable correlation to drop tests and actual field performance.

Studies indicate that 70% of sewn bag breakage ordinarily is at the sewn closure, even on Clupak paper bags, because the sewn closure is the weakest point in the bag. Often this breakage was incorrectly blamed on the paper. Now stronger ImpacTape opens the door to profits from the greater toughness and possible basis weight reductions which Clupak paper is delivering to thousands of users. *This is realistic research achievement —aimed straight at reducing your total packaging costs.*

For a brochure giving detailed information, write and tell us whether you use sewn open mouth or sewn valve bags. Multiwall Bag Division, West Virginia Pulp and Paper Company, 230 Park Ave., New York 17, N. Y.

**Clupak, Inc.'s trademark for extensible paper manufactured under its authority and satisfying its specifications.*

***Patent Pending.*

West Virginia
Pulp and Paper

Washington News Letter

By S. HERBERT UNTERBERGER

NOTHING in Washington quite compares with the smoothness that has characterized the transition from the Eisenhower to the Kennedy Administration. Much of the credit for this must go to the outgoing administration which, despite bitter feelings resulting from the narrow Republican defeat, showed its good will and paramount concern for the welfare of the country by co-operating fully in the transfer of power.

It is almost without precedent to find outgoing cabinet members and other high administrative officials devoting the final weeks in office to the training of their successors and to supplying office space to them and their staffs. This has occurred, at least in the departments of Defense and Justice.

It is almost without precedent to have an outgoing cabinet official from one political party expressing high regard for his successor, a man from the opposite party. But this is exactly what happened in the Labor Department, where Secretary James Mitchell is reported to have said about his successor, Arthur Goldberg, that "Kennedy could not have picked a better man."

Unpopular Legacy All the good will in the world, however, could not offset the fact that the outgoing administration has left the incoming one with a legacy of unsolved problems. The most immediate problem, although perhaps not in the long run the most important one, is the relatively unhealthy state of the national economy.

With respect to this obviously serious problem, which demands immediate attention, the new administration had, in fact, begun to "take over" at least two weeks before the inauguration. Shortly after the first of the year, so-called task forces appointed by (then) President-elect Kennedy had made their reports. Those most directly relevant to the economic problem were the reports of the task force headed by Senator Paul Douglas of Illinois, dealing with the problem of depressed areas, and the report on the economic situation by a task force headed by Professor Paul A. Samuelson of the Massachusetts Institute of Technology.

DOUGLAS TASK FORCE REPORT

Immediate Measures Recommended Both reports dealt with both short-range and long-range problems. With respect to the depressed areas, those in which chronic unemployment appears to be characteristic, the committee of Senator Douglas recommended that the Federal Government provide funds immediately to extend the unemployment compensation benefits for idle workers who have exhausted their rights to such benefits. Unlike the program employed by the Eisenhower Administration in the last recession, this committee recommended that the federal funds advanced to the states should be in the form of grants, rather than loans. Readers of this report were reminded that although the previous funds had been extended as loans, the states most severely hit by unemployment were also the states which had not been able to repay the loans.

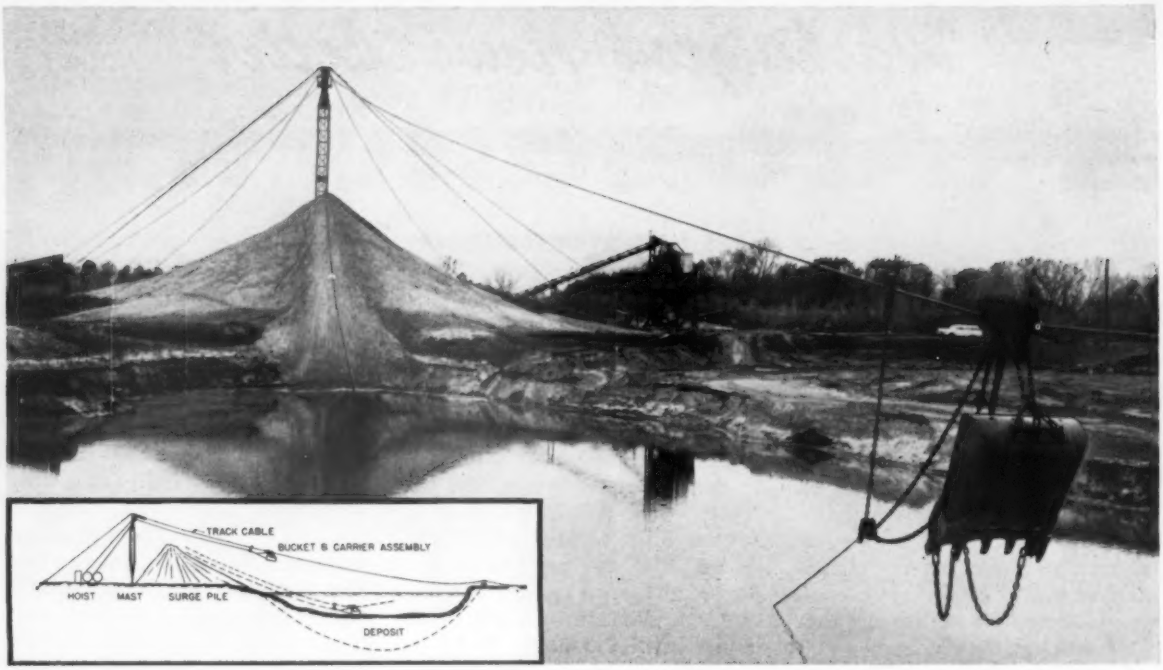
As a second immediate measure, that report recommended that if no national emergency public works programs are undertaken, there should be an emergency program of small public works projects limited to the depressed areas. It also suggested the distribution of surplus food to destitute workers in these areas and federal grants to the states to help them advance direct relief to needy persons. All of these are standard New Deal type programs.

Measures Urged for Long-Range Programs Of greater significance are the longer-range programs recommended by the Douglas task force, which recommended measures for rebuilding the economy of these areas. The recommendations included direct federal loans to business firms that would build new factories and stores in these areas at low interest rates; direct federal loans to cities and towns for improvements of facilities such as roads, water works, industrial land, and buildings; federal purchase of mortgages now held by local development organizations in order to provide them with capital for encouraging new ventures in these areas; changes in various regulations and legislation which would permit channeling defense orders into distressed regions and expediting federal projects, such as highway programs, in these parts of the country; special tax amortization on plants expanding in these areas; and the federal insurance of loans made by private banks to redevelopment programs in depressed regions.

In addition, the investigating group suggested giving federal aid to schools in the districts needing help, setting up Youth Conservation Groups composed primarily of local people, and creating special development commissions for the areas hardest hit, such as the hard and soft coal regions, the textile region of New England, and the timber and ore regions in the upper Great Lakes.

Indeed, if any substantial proportion of the Douglas recommendations are adopted by Con-

(*Continued on page* 71)



Dig, Haul And Stockpile For 6 Cents Per Ton...

If you are planning a new plant or modernizing an old one, consider the economies of digging and hauling your raw material with a Slackline Cableway. Direct operating costs run about 6 cents per ton for operator's wages, power and maintenance when working average deposits and hauling to a surge pile.

The Slackline Cableway's handling capacity is governed by haul distance and digging depth. This allows fast, short hauls when maximum tonnage is needed to meet demands. Conversely, when time permits, the reach of the Slackline can be stretched to the extreme limits of the deposit to rebuild or create a reserve pile. The use of a surge pile in conjunction with a Slackline enables operations to continue when plant processing is halted due to weather or stoppage. This reserve of material also makes it unnecessary for the Slackline to continuously match plant tonnage requirements.

A Slackline can begin operation at ground level and dig to depths which cannot be reached with other equipment. It digs 125 ft. below water and hauls up to 1000 ft. This deep digging assures maximum clean-up of your deposit. The additional material obtainable with a Slackline can keep your plant running longer without expensive relocations of equipment.

Call or write for more information on the low operating costs and long service life of a Slackline Cableway. Request Catalog C for general information.

Average Cost For Operator's Wages, Power and Maintenance Using a Sauerman Slackline

Slackline Bucket dumps automatically over surge pile. Material is dug from a deep deposit on an 800 ft. operating span.

SAUERMAN BROS., INC.

634 So. 28th Avenue, Bellwood, Illinois
Linden 4-4892 • Cable CABEX—Bellwood, Illinois

Crescent DragScrapers • Slackline and Tautline Cableways • Durolite Blocks

Labor Developments

By S. HERBERT UNTERBERGER

S. Herbert Unterberger and Company
Economists-Consultants on Labor and Industrial Relations
Washington, D.C.-Philadelphia, Pa.

THE most important labor development, the one that overshadows all others, is the rising rate of unemployment. If present trends continue, the 1961 rate of unemployment may top the highest post-World War II figure of 7½ percent. If this were to occur, it would, no doubt, change not only the collective bargaining outlook but probably the legislative outlook, as well.

With respect to legislation, the labor proposal with highest priority is for the increase in the minimum wage and the extension of coverage of the Federal Wage and Hour law.

It looked as though the passage of this legislation would be a fairly simple matter until Senator Fulbright raised some very serious questions about it. While the reason for his doubts are not entirely clear, there is a growing area of opinion that further increases in the minimum wage at this time might aggravate rather than help solve this unemployment problem.

It has been observed that many of the industries which would be affected most substantially by an increase to the $1.25 minimum wage are also industries which are in a relatively unhealthy economic position. The most outstanding example is the textile industry which, particularly in the South where most of it is now concentrated, operates generally with minimum wages in the $1.00 to $1.10 range.

Principally because of foreign competition from Japan and other countries, even at these relatively low wages the industry is having great difficulty in competing. There is a large proportion of unused capacity and a significant number of unemployed textile workers. A further increase in minimum wages might, very well, aggravate this problem.

It is for this reason that, if changes occur in the Wage and Hour Law, great pressure will be exerted to keep this increase modest, probably limited to 15 cents. This action will automatically increase the pressure to extend the coverage of the law to industries not yet covered. The most vulnerable of these is retailing, particularly large-scale retailing such as department and chain stores which, for the most part, have been exempt from the requirement to pay the statutory minimum wage and, perhaps more importantly, the overtime requirement.

A situation that appears to be an almost cut-and-dried matter is therefore almost certain to generate a good deal of debate, principally because of rising unemployment; and the final result, from present indications, will be a good deal less extreme than it would be, were the economy burgeoning.

Moreover, because of a relatively loose labor market, the serious threat of difficult strikes is far less likely to develop in 1961. This is a year in which a number of contracts involving whole industries or large segments of industries are due to reopen. Thus, in February a very large contract involving the women's dress industry must be renewed; in April and May the contract involving the manufacture of tires and tubes must be renewed; and in August the contract involving virtually the entire automobile manufacturing industry must be renewed.

Particularly the automotive industry has given much concern since the bargaining in this industry is generally very difficult. This is so because there are very strong power forces on both sides of the bargaining table. It will be remembered that the last contract renewal in the automobile industry also occurred during a period of relative recession. As a consequence, the labor agreement expired before a new agreement was signed. Contrary to the usual procedure, the employees did not strike but continued to work without a contract for a considerable period of time.

Even at the end of that long delay, the contract finally signed provided very little more in the way of improvement than could have been obtained at the very outset. In the automobile industry, there is a reasonable possibility that there will be a repetition of this history. It is now virtually certain that the automobile union will not be able this time to recover what they regard as their losses of the last time. Indeed, at the moment, the industry's employment is continuing to decline, with no immediate end in sight.

It should be noted that one of the other important labor agreements subject to renewal is in the tire and tube industry whose fate is closely allied to the fate of the automobile industry. Here, too, the immediate trend is toward declining employment.

While a declining employment trend may, temporarily, contribute to the cause of labor peace, it is complicating the effort toward solution of long-run labor problems. Among these is the problem of "feather-bedding," to which President Eisenhower's Secretary of Labor, James Mitchell, will be devoting a considerable amount of time and effort. That problem is be-

(*Continued on page 74.*)

SIMPLICITY

GRIZZLY FEEDER

3' x 10' Model OA—10—A3

eliminates need of apron feeder and scalper . . .

Rock can't jam . . . hourly operating costs lowered

The unique design of the Simplicity Grizzly Feeder, which combines feeding and scalping in one operation, eliminates rock jams thus assuring positive uniform flow of material into the crusher.

One operator of a Simplicity Grizzly Feeder says: " . . . we have used the heaviest type of apron feeders for years and have found it necessary to shut down at least 2 or 3 times a year to hard surface the flights, inasmuch as our material is so abrasive . . . we installed a Simplicity (Grizzly) Feeder . . . with 1/4" pan and 3/16" liner . . . and are glad to report that, AFTER 9 MONTHS OF CONTINUOUS OPERATION, THE FEEDER PAN SHOWS PRACTICALLY NO WEAR WHATSOEVER, and is operating around the clock doing an excellent job of feeding at all times . . . "

3' x 12' Model OA—10—A3

The Grizzly Feeder costs less than 50% of the combined apron feeder and scalper . . . weighs considerably less . . . makes a more compact plant . . . and reduces loading height by several feet. While these factors show up so prominently in portable plant production, they are just as effective in a permanent plant installation for the crushed stone, sand and gravel and mining industries.

214

Send for Catalog #571 for complete information on OS-A-VEYOR and GRIZZLY FEEDERS.

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FOR EXPORT: Brown & Sites, 50 Church Street, New York 7, New York

Simplicity
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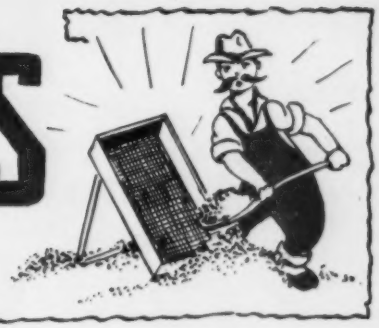
SCREENINGS



By RAY L. SMITH JR.

A MAN without some vice is suspect.

This doesn't mean everyone has either to smoke, drink or raise cain or participate in some other form of anti-social behavior.

But a man who has done nothing in a lifetime leaves little to be said in his last rites.

An editor said he once knew a man who indulged in no shenanigans.

"He died at the age of ninety-five. He never took a drink, never contributed to his church or community and never had any close friends. About the only thing he did was get old. When he passed away the preacher couldn't think of a thing to say about him. So the preacher read a couple of Psalms and the pallbearers talked about the weather and insurance on the way to the cemetery."

Moral of the story, says the newsman, is keep away from drinking, smoking, overeating, worry and loss of too much sleep and you'll live to be extremely old.

"All of which might get you so bored and depressed that you'll commit suicide . . . "

Hokum, Hokum

AS A LONG-TIME hokum hunter, it's a pleasure to denounce the annual nonsense of naming the world's best dressed woman.

Fashion designers, obviously, base their decisions on popularity and the amount of money spent on wardrobes.

Mrs. Dulcet Tone, a beauteous but unknown creature who lives in Swamp Holler, may well deserve the "title" but has no chance due to her status of the unknown.

The gal who spends the biggest bundle among the clothes horses is a shue-in, however a drab item she may be.

Potpourri and Succotash

A Carlsbad lady who rents rooms told a prospect she didn't want any more space rocket experts, last one ruined her ceiling experimenting.

The visitor asked: "Those spots up there, I suppose they're results of the rocket expert's experiments?"

"No, indeedy," said the landlady. "Those are the expert."

Be the first in the office every morning, the last to leave at night, never be absent, always work through your lunch hour, and one day the big boss will call you in and say, "I've been watching your work very carefully, Jones. Just what are you up to, anyhow?"

A chemist stepped up to the drug counter, hesitated a moment, and asked for some prepared acetylsalicylic acid.

"You mean aspirin," said the druggist.

"That's right," the chemist smiled apologetically. "I never can remember that name."

Doris: When is your sister thinking of getting married?
Tom: Constantly.

Hostess: "I have a lonesome bachelor I'd like you girls to meet."
Athletic Girl: "What can he do?"
Chorus Girl: "How rich is he?"
Society Girl: "Who are his family?"
Religious Girl: "What church does he go to?"
Secretary: "Where is he?"

Some women can dish it out much better than they can cook.

Eli Whitney's last words: "Keep your cotton pickin' hands off my gin."

Problems our forefathers never dreamed of will face posterity, such as how to crowd two coffee breaks, lunch, a meeting of the bowling league and a bridal shower for one of the stenographers into a 3-hour working day.

Jake the Welder was out with the boys one night and before he realized it, day had dawned. He hesitated to call home, but finally hit upon a brilliant idea. As soon as his wife answered, he shouted, "Don't pay the ransom, honey! I escaped!"

Police Court Judge: "Young man, your face looks very familiar. Have you ever been convicted by this court?"

Witness: "No, your Honor!"

Judge: "Remember, you're under oath. Where have I seen you before?"

Witness: "I'm the bartender in the saloon across the street."

A little fellow was visiting his uncle and grandfather. "Uncle," he said after his grandfather had left the room, "how old is grandpa?"

"I couldn't tell you," replied his uncle, "without looking it up in the family bible."

"Oh!" gasped the boy. "Is he old enough to be mentioned in the Bible?"

NEW 631 420 HP (335 HP flywheel) . . . 31.2 MPH . . . 28 cu. yd. (21 cu. yd. struck).

NEW 630 420 HP (335 HP flywheel) . . . 41.5 MPH . . . 630A Tractor-Scraper . . . 28 cu. yd. (21 cu. yd. struck). 630-482C Tractor-Scraper . . . 35 cu. yd. (27 cu. yd. struck).

NEW ATHEY ROCK WAGONS
38 ton PR630 and PR631 built by Athey Products Corporation.

BIG! POWERFUL! NEW CAT 630 AND 631

MATCH POWER TO JOB CONDITIONS—AUTOMATICALLY!

A new concept in power shift transmission coupled with a new 420 HP engine . . . plus other proven new developments . . . provides the last word in operating, service, maintenance ease and economy. The four-wheel 630 and two-wheel 631 join the widely accepted DW20, DW21 and 619 to give you an even broader choice of hauling units from Caterpillar.

The new transmission and new engine on the 630 and 631 are designed and teamed to fit power to working conditions. This tailored power train, together with unit construction, greater scraper and wagon capacity, air-actuated cable control and new tires, makes the 630 and 631 the ultimate in hauling equipment design! Some of the features are described here. For complete proof of performance, ask your Caterpillar Dealer!

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

ADVANCED AS TOMORROW —CERTAIN AS YESTERDAY

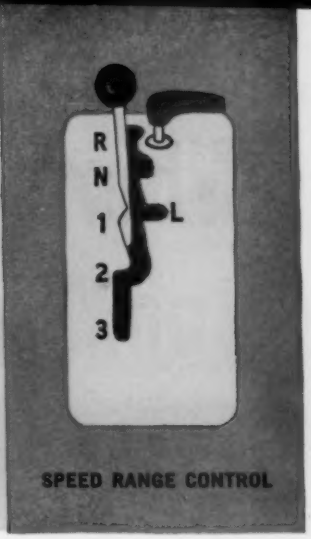
NEW 29.5 x 35 TIRES
This all-new tire size was originally developed for the 630 and 631, to provide the best combination of size, capacity and rideability at lowest cost per yard. These tires were proven by exhaustive laboratory and field tests.

NEW SCRAPERS
Matching 28 cu. yd. heaped (21 cu. yd. struck) scrapers feature increased capacity, better loading. Sheave bearings now have 125-hour lubrication period. Other matching trailed units are also available.

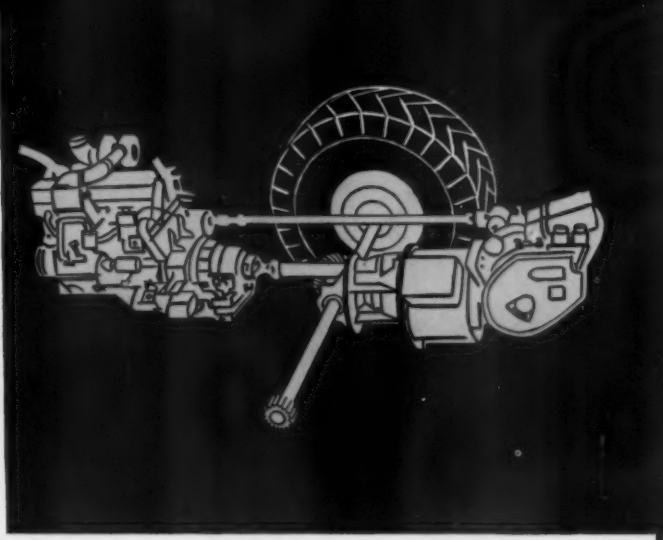
NEW CABLE CONTROL
Live power provides control whenever the engine is running. Air-actuated controls cut operator effort in half, yet retain "feel" of the control. New cable savers prevent breakage due to double-blocking.

IMPROVED STEERING
New two-jack steering makes the 631 easy to maneuver, yet retains "feel" of the road. Improved steering for the 630 absorbs shocks outside of the steering gear, provides easier handling in tight quarters.

SHIFT INDICATOR



SPEED RANGE CONTROL



3 SHIFTS—9 SPEEDS

POWER SHIFT TRANSMISSION. This new concept in power shift transmission automatically adjusts the 630 and 631 to job conditions. Key to this system is the torque divider transmission mounted directly behind the engine, which combines planetary gears with a torque converter so as to provide power to the three-speed-range transmission in one of three ways: (a) torque divider drive (a combination of 75% direct, 25% torque converter); (b) direct drive; (c) overdrive. Result: nine different speed variations—*but* the operator need only concern himself with the three speed ranges and load range controlled by one lever. (A safety latch prevents accidental engagement.) The rest is completely automatic, governed by a mechanical-hydraulic system. Here's how it works:

Operator moves lever into *1*, first range, to start machine down haul road. The machine is now in torque divider drive for easy start and greatest rimpull. As speed increases, converter is no longer required, so the transmission shifts *automatically* to direct drive. When conditions permit, it automatically shifts to overdrive. As speed increases, the shift indicator dial shows operator when to shift to second speed range, *2*. Again the transmission automatically goes into torque divider drive. As before, when conditions permit, it automatically shifts to direct drive and then to overdrive. This same cycle can be repeated in third range.

NEW 420 HP ENGINE AND MATCHED POWER TRAIN

Downshifting is automatic, too. As transmission senses increasing power needs, it shifts down from overdrive to direct drive to torque divider drive. When conditions require it, the indicator tells the operator when to select the next lower speed range. Once back in the cut, operator shifts to load position, *L*. This locks the transmission in torque divider drive of the first speed range.

ALL-NEW CAT ENGINE. Designed specifically for the 630 and 631, this six-cylinder, 5.4″ bore x 6.5″ stroke D343 engine is turbocharged and aftercooled. It develops 420 HP maximum (335 HP at the flywheel).

Typical of the newness is head design. The engine is parallel ported with dual intake and exhaust valves for most efficient air system. Overhead camshafts eliminate rocker arms and push rods. New shelf head design results in fast coolant circulation for outstanding heat dissipation.

In addition to these and other new features, the engine offers . . . the economies of the proven Cat fuel system with precombustion chamber (burns No. 2 fuel oil—premium diesel fuel not required) . . . pressure ratio controlled turbocharger for optimum air flow throughout the engine operating range . . . aftercooler for greater air density for more complete combustion.

FULL UNIT CONSTRUCTION—EASIER SERVICING

TRANSMISSION UNITS

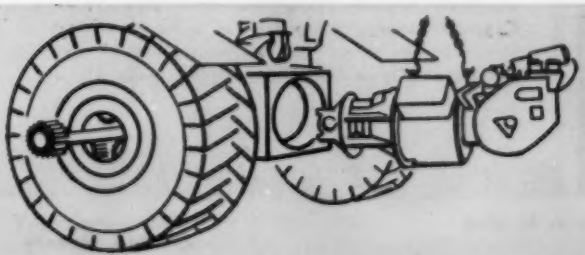
Range transmission is case mounted for accessibility, can be removed as a unit with cable control and differential carrier. Another timesaver: torque divider transmission is removable as a unit without disturbing the engine. Transmission control units are accessible without disturbing the transmission.

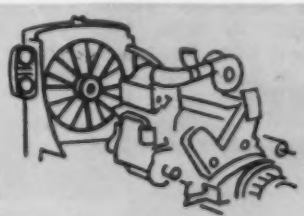
NEW RADIATOR-FAN UNIT

Fan is mounted on the radiator for more efficient cooling. Now radiator, side plates and fan can be removed as a unit for servicing—or to provide easy access to the front of the engine.

SERVICING TIMESAVERS

Dash swings away to expose entire left side of 631's engine. Crankcase guard pivots down for easy access to the bottom of the engine. For easy tire removal, rear fenders tip forward on the 630, and are easily removable on the 631.

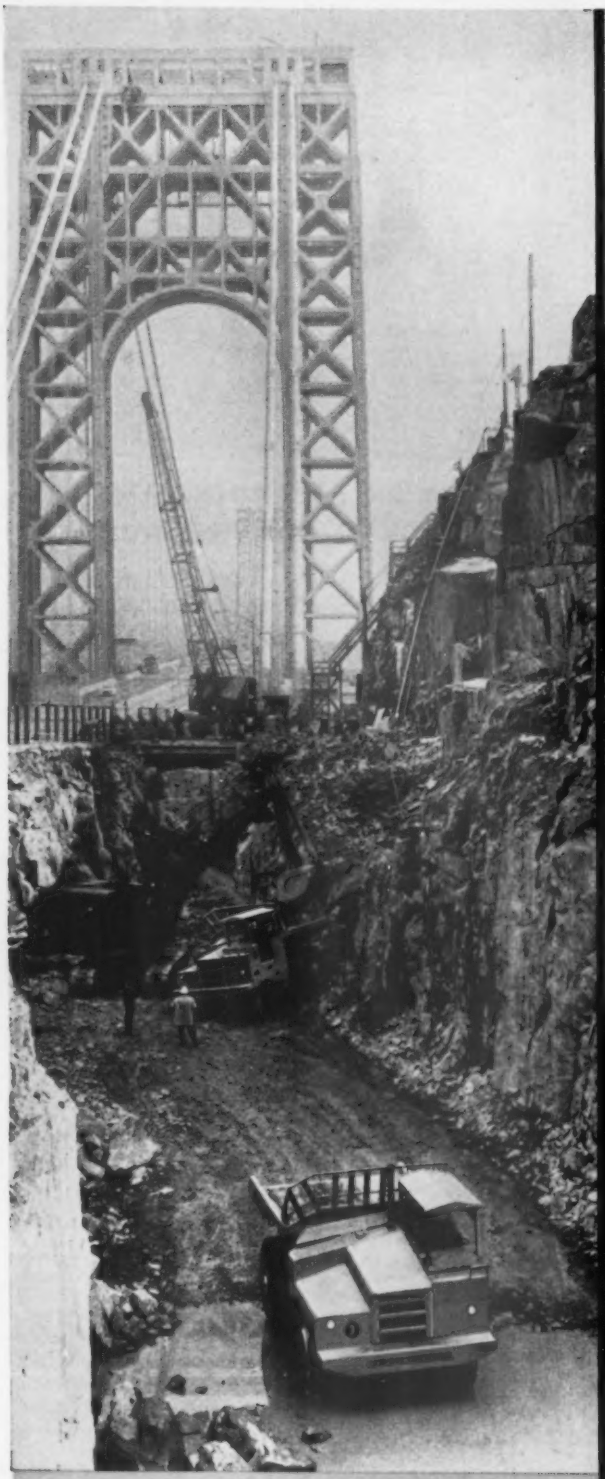




Enter 16 on card, page 169

Where there's Model 100

DUMPTOR CUTS HAUL TIME IN HALF — Matched against another leading rear dump unit, DUMPTOR recently shaved haul time in half for one operator. Job involved a 603-ft. one-way haul, 204 feet was down a 20% grade. Average trip time: 1 minute, 38 seconds.



DUMPTOR SPEEDS NARROW ROAD CUT — George Brewster & Sons, Inc., use DUMPTORS to haul rock for construction of approach ramps to lower level of George Washington Bridge. In places cut is so narrow it prohibits turn-around operations — no problem for dual-controlled DUMPTOR.

MINING ABOVE GROUND AND BELOW — Cramped-quarter underground work, and long steep hauls above prove no problem for DUMPTORS in Canadian copper mine.

no room or time to turn DUMPTOR® outhauls all others

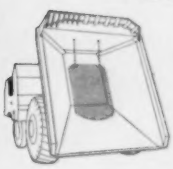
HAULING DOLOMITE IN AFRICA — This DUMPTOR is at work in a quarry near Johannesburg. Job requires a 600-yard haul. Haul time is 2 minutes, 2 seconds. Dump and return time: 1 minute, 52 seconds. DUMPTOR averaged 120 cu. yds. every 50 minutes.

SAND AND GRAVEL SHUTTLE — DUMPTOR is popular in sand and gravel pits, too. Makes quick work of hauling from loader to crusher and screens . . . no need to turn.

• More trips per shift

Pivoting seat, dual controls for fast, no turn operation. Travels up to 24 mph in either direction. Ideal for working narrow cuts, on grades, and making the most of time on straightaways.

• Bigger payloads



Carries up up to 30,000 lbs. Big 10′ x 10′ square body designed to self-center material — assure full heaped loads every trip. Instantaneous or controlled gravity dump.

• Lower maintenance

Planetary drive axles. Shafts, gears, and differential carrier assembly can be serviced without removing wheels or tires. Oscillating steering axle keeps twists and strains of road travel away from main frame. Dump body is heavily reinforced.

GET ALL THE FACTS — see your Koehring distributor soon. Ask him about the Model 60, too! An 8-ton hauler that delivers the same timesaving features as the 15-ton Model 100. K15

KOEHRING
DIVISION OF KOEHRING COMPANY
Milwaukee 16, Wisconsin

STEPHENS-ADAMSON

BELT CONVEYOR

handles greater tonnage at lower cost

Tons of crushed stone and aggregates are carried fast, efficiently and at a lower cost per ton on STEPHENS-ADAMSON Belt Conveyors. S-A quality engineered conveyor components increase materials handling efficiency while reducing equipment "down time" to a minimum. Long-lasting, low maintenance dependability is built into every S-A belt conveyor. Convey with S-A . . . the Equipment that's designed and built by the men who know conveying best . . . STEPHENS-ADAMSON.

S-A ENGINEERED PRODUCTS FOR BULK HANDLING

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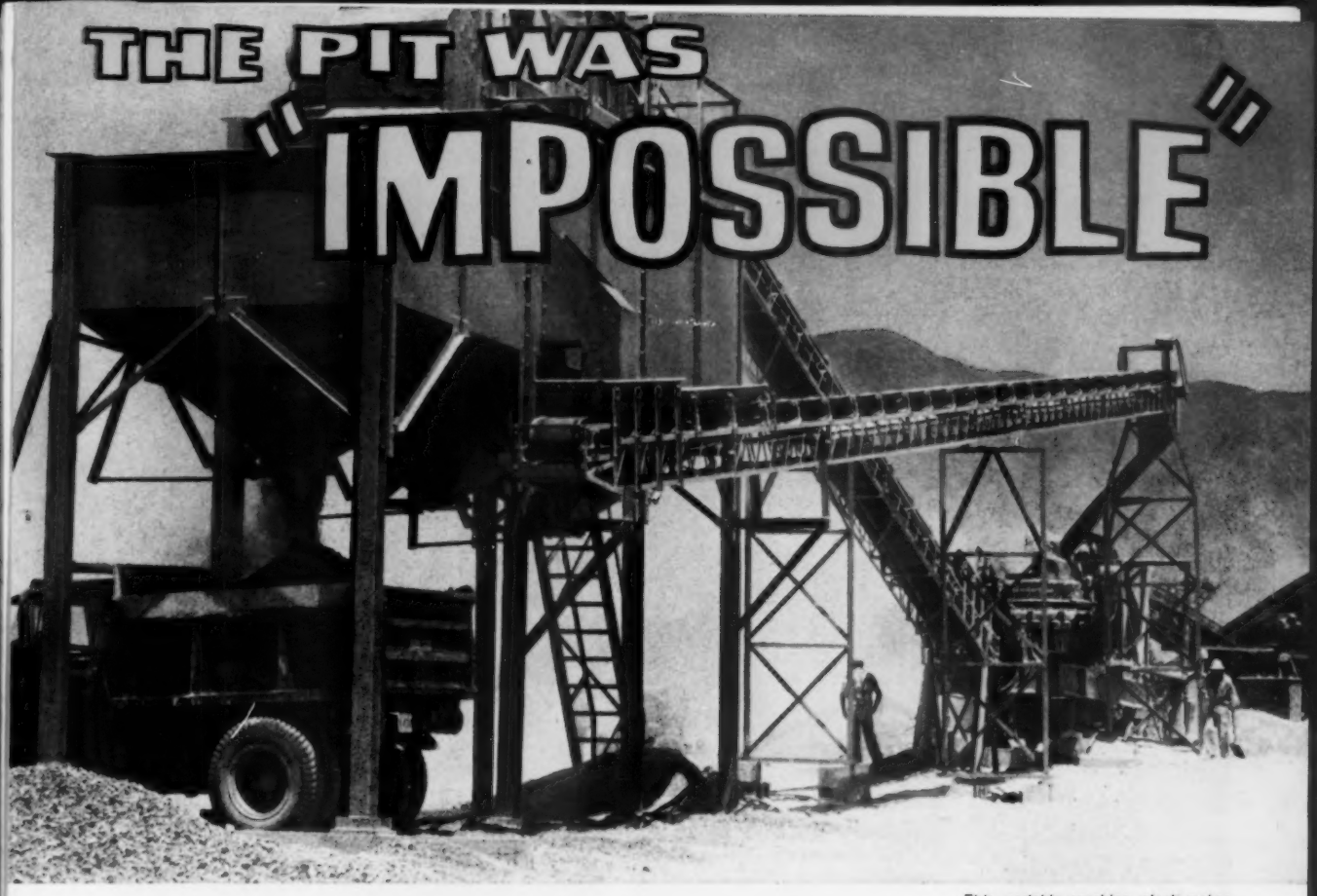
BELLEVILLE, ONTARIO

THE PIT WAS "IMPOSSIBLE"



This portable crushing plant makes good use of Symons Cone Crusher advantages. The Symons Cone permits production of two grades of specification material simultaneously, thus eliminating the need for expensive secondary handling.

. . . but a SYMONS® CONE CRUSHER changed it into a 500 ton per hour profit-maker

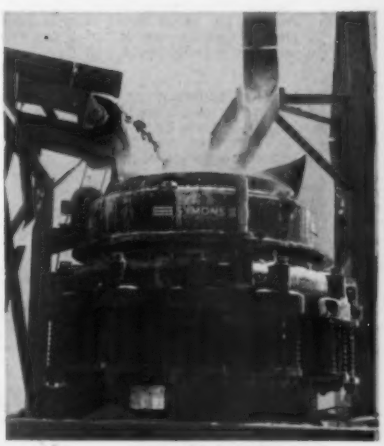
Here's how Texas contractor Hugh McMillan solved his problem of making a bad—but valuable—pit pay off.

His "impossible" pit near El Paso was too rocky to qualify for 1½" sub base, contained an excessive amount of large boulders, and was too dirty for production of hot-mix aggregates and cover chips without excessive fines. The only profitable way to produce both sub base and 100% crushed aggregate was to produce both materials simultaneously.

By incorporating a portable Symons 4¼ ft. Standard Cone Crusher unit in a Cedarapids Unitized Plant to up-grade the hot-mix aggregate and cover chips, McMillan produced approximately 500 tons per hour of strict specification material. He turned out a ratio of 20% of all-crushed aggregate to 80% of sub base material simultaneously to achieve the perfect proportion to meet quantity requirements and permit using all the material in the pit.

The Symons Cone Crusher's successful handling of McMillan's tough job is another example of its versatility in portable as well as stationary installations.

Write for descriptive literature.



SYMONS® CONE CRUSHERS

. . . the machines that revolutionized crushing practice . . . are built in a wide range of sizes, for capacities to over 1500 tons per hour.

NORDBERG MANUFACTURING COMPANY · Milwaukee 1, Wisconsin

NORDBERG

SYMONS . . . a registered Nordberg trademark known throughout the world

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ATLANTA · CLEVELAND · DALLAS · DULUTH · HOUSTON · KANSAS CITY · MINNEAPOLIS · NEW ORLEANS · NEW YORK · ST. LOUIS
SAN FRANCISCO · TAMPA · WASHINGTON · WICHITA, KAN. · TORONTO · VANCOUVER · JOHANNESBURG · LONDON · MEXICO, D.F.

ABOVE: G-900 TRACDRILS with "Hydra-poise" knee-action have unmatched maneuverability and stability to sink blast holes in any formation. Independently operated, extra-long crawlers provide 1350 square inches of ground contact. Two sets of grouped controls—one at turret, the other at boom end—save time and steps for driller.

BELOW: A battery of "POWER VANE" ROTARY COMPRESSORS, supplies air to a group of G-900 Tracdrils on a big project. Used singly or in batteries, "Power Vane" Rotaries have the "Go-Power" you need to keep your air-powered equipment producing at full capacity.

G-900 TRACDRILS

are at their best in the toughest terrains and formations

... let their power and stamina deliver more blast holes per shift for you! Mention treacherous footing and hard rock and you've got a job for Chicago Pneumatic G-900 Tracdrils and "Power Vane" Rotary Compressors.

Operators find the new G-900 a mining man's drill. It's got everything a driller expects from a high production rig ... plus some real exclusives, too! It can drill directly alongside tracks with 180° full boom swing. It handles horizontals 11 feet high at the face, or snake holes at ground level. And you can't beat the G-900 for safety. Release the throttle and heavy-duty brakes lock automatically ... keep drill from shifting or creeping ... hold hard on really bad ground.

Backed up by rugged, always reliable CP-600 "Power Vane" Rotary Compressors with the "Go-Power" to meet every air demand, you can lick the toughest formations you'll ever find. Write for your copy of the new bulletin SP-3267 on the revolutionary G-900 Tracdril. *Chicago Pneumatic Tool Company, 8 East 44th Street, New York 17, New York.*

Chicago Pneumatic

TRACDRILS • AIR COMPRESSORS • PNEUMATIC TOOLS • AIR WRENCHES • REICHdrills

News of the Industry

Pettinos Interests in U.S.A. Merged with Parent Firm In Consolidation Program

George F. Pettinos, Inc., of Philadelphia has completed a program to streamline the corporate structure of its American interests. The project was started in 1959 with the purchase of Sonittep Transportation Company and the merger of Reading Sand Company with Bridgeton Sand Company. As of January 1, 1961, the remaining American subsidiaries— Bridgeton Sand Company, Cape May Sand and Gravel Company, and Silos, Incorporated, in New Jersey; A. T. Harris Sand Company in Pennsylvania; and Pettinos New England, Inc., in Massachusetts—were merged into George F. Pettinos, Inc.

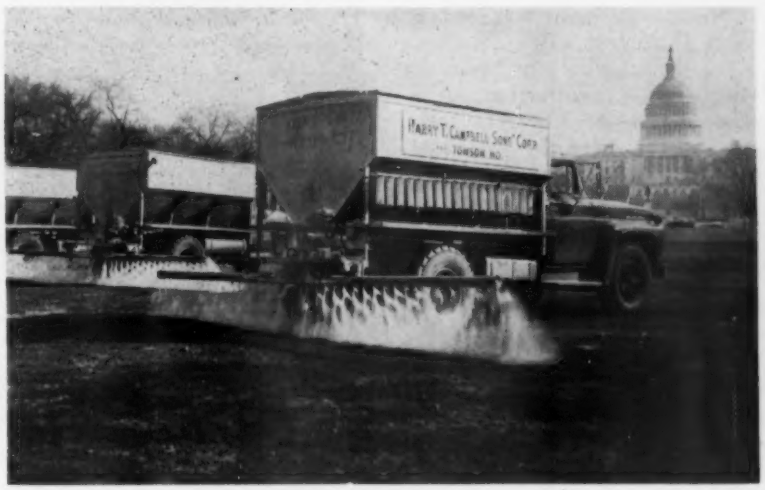
"The consolidation of the operations of our seven affiliated companies with those of the parent corporation, along with continued development of product lines and expansion of facilities, will enable us to better serve the needs of our American and Canadian markets," stated George F. Pettinos Jr., president of the parent firm.

In Canada George F. Pettinos (Canada) Ltd. maintains operations at Hamilton, Ont., and Montreal, Que.

Arkansas Silica Operation Makes Initial Shipment

National Silica Company's $500,000 plant near Little Rock, Ark., recently went into production on a limited scale. Full-scale production is expected to be at the rate of 120 t.p.h. The deposit furnishing the raw material is estimated to contain 500,000,000 tons of silica.

Products of the operation will be utilized in glass manufacturing, foundries, as fracturing sand in the oil industry, and as silica flour.



● The grass may look greener this year on the mall between the Capitol and the Washington Monument in Washington, D.C. It was given a "health treatment" by Harry T. Campbell Sons' Corporation of Towson, Md. One ton of agricultural limestone was applied to each of the 300 acres of the Capitol mall by four spreader trucks (three of which are seen above) working simultaneously.

Coming Events

February 5-9, 1961—Los Angeles. 42nd annual meeting, Associated Equipment Distributors. Statler and Biltmore hotels.

February 20-23, 1961—St. Louis. 57th annual meeting and exhibit, American Concrete Institute. Chase-Park Plaza Hotel.

February 23-24, 1961—St. Louis. Annual meeting, Expanded Clay and Shale Association. Sheraton-Jefferson Hotel.

February 26-March 2, 1961—Boston. Annual convention, Associated General Contractors of America. Hotel Statler.

February 26-March 2, 1961—St. Louis. Annual meeting, American Institute of Mining, Metallurgical, and Petroleum Engineers. Ambassador and Chase-Park Plaza hotels.

April 27-28, 1961 — Cleveland. Annual meeting, National Slag Association. Sheraton-Cleveland Hotel.

May 11-13, 1961—Point Clear, Ala. Annual convention, National Lime Association. Grand Hotel.

Construction Put in Place Holds Dec., 1959, Level—Year's Total Near Record

The value of new construction put in place in December, 1960, amounted to $4.4 billion, according to preliminary estimates of the U. S. Department of Commerce. This amount was 9 percent less than in November (and a normal seasonal change) but only 1 percent below December, 1959.

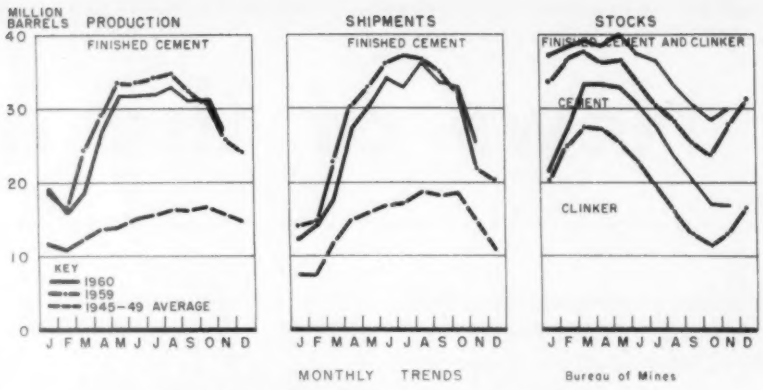
For the calendar year 1960, the value of new construction put in place totaled $55 billion—a figure just 2 percent below the record total of $55.2 billion reported for 1959.

DECEMBER ITEMS: Private construction, estimated at $3.1 billion, was 7 percent less than in November, 1960—a shade under the usual seasonal decline; but it was 3 percent below the $3.2 billion reported in December, 1959. Residential was estimated at $1.7 billion —down 8 percent from November (less than the seasonal change) and down 9 percent from December, 1959.

Public construction, estimated at $1.2 billion, registered more than a normal seasonal decline from November, but was 4 percent above December, 1959.

CALENDAR YEAR ITEMS: Private construction estimated at $39 billion, was 2 percent below 1959. *Public construction,* estimated at $16.1 billion, was only 1 percent below 1959.

► A significant aspect of the year-to-year change was the large decrease — $2.4 billion — in private residential building. This amount was only partially compensated for by the $1.1 billion increase in private nonresidential building.



— November, 1960, Finished Portland Cement —

SUMMARY—Production of finished portland cement in November, 1960, as reported to the U. S. Bureau of Mines, totaled 26,406,000 barrels—an increase of 1 percent compared with November, 1959. Mill shipments totaled 24,917,000 barrels—an increase of 13 percent compared with November, 1959. Stocks of 29,985,000 barrels of finished portland cement on hand were 8 percent more than those on hand November 30, 1959. Clinker production during November, 1960, totaled 26,099,000 barrels—a decrease of 5 percent compared with November, 1959.

►PRODUCTION—One hundred and sixty-eight plants in 39 states and Puerto Rico reported a production of 26,406,000 barrels during November, 1960, compared with 26,100,000 barrels in November, 1959.

Production of clinker was 26,099,000, compared with 27,547,000 barrels during the same month last year.

High-early-strength portland cement totaled 1,449,000 barrels—an increase of 13 percent over the November, 1959, production.

Prepared masonry cement production of 1,190,000 barrels increased 0.3 percent over the November, 1959, production.

►SHIPMENTS—Mill shipments of finished portland cement from one hundred and seventy-five plants totaled 24,917,000 barrels, compared with 22,025,000 barrels in November, 1959.

Shipments were higher in 17 districts and lower in 6 districts. The greatest increases were in the Iowa and Indiana-Kentucky-Wisconsin districts.

Shipments of high-early-strength portland cement totaled 1,213,000 barrels—an increase of 9 percent over the 1,111,000 barrels shipped in November, 1959.

Shipments of prepared masonry cement totaled 1,151,000 barrels—an increase of 11 percent over the 1,034,000 barrels shipped in November, 1959. Prepared masonry cements are shown in 376-lb. barrels although they are sold in barrels of varying weights.

►STOCKS—Mill stocks of 29,985,000 barrels of finished portland cement were on hand on November 30, 1960—an increase of 8 percent over the 27,794,000 barrels on hand November 30, 1959. Stocks of clinker on hand November 30, 1960, totaled 16,787,000 barrels, a rise of 27 percent over the 13,169,000 barrels on hand November 30, 1959.

►FIRST ELEVEN MONTHS OF 1960—For the January-November period, the production volume of finished cement amounted to 298,352,000 bbl., compared with 314,424,000 bbl. in the 1959 eleven-month period. Total shipments for the first eleven months of 1960 are reported at 297,102,000 bbl.; in the same period of 1959 total shipments were 314,724,000 bbl. (Shipment figures do not include finished cement used in the manufacture of prepared masonry cement, as follows: November, 1959—194,000 bbl.; January-November, 1959—2,665,000 bbl.; November, 1960—271,000 bbl.; January-November, 1960—2,602,000 bbl. ●

British Columbia Producers To Make Pozzolan Cements

Plans to manufacture and market a new cement have been announced by the British Columbia Cement Company and British Columbia Lightweight Aggregates, Ltd., Vancouver, B. C.

These two companies have developed a technique for producing a pozzolan cement which will be distributed as a premixed product.

Shale for the new product is processed at the lightweight aggregate company's Saturna Island plant. It is then shipped to British Columbia Cement's Bamberton plant, where it is blended under strict control to make four types of pozzolan cement.

The Fourth Symposium on Rock Mechanics will be held on March 30 and April 1 at Pennsylvania State University, University Park, Pa. Technical sessions will cover static loading, dynamic loading, underground stress, instrumentation, and roof and ground control. Emphasis will be on problems of mining technology and science. These continuing meetings are sponsored by the Colorado School of Mines, the University of Minnesota, the University of Missouri School of Mines and Metallurgy, and Penn State.

A-C 1961 Prospects Good—With Increased Profits

According to a statement issued by R. S. Stevenson, president of Allis-Chalmers Manufacturing Company, the firm's sales volume in 1961 is expected to be about the same level as that of 1960, and profits are expected to be higher.

Mr. Stevenson based this view on three factors—a gross farm income at least as high as that of last year, more highway construction, and orders for capital goods equaling 1960.

Russell Elected President, Fisher Board Chairman Of Hawaiian Cement Corp.

Walter C. Russell has been elected president and chief executive officer, and Robert D. Fisher board chairman of the Hawaiian Cement Corporation.

Mr. Russell will continue as president of the American Cement Corporation, dividing his time between Detroit and Honolulu. Before becoming president of American Cement in 1959, he served for 25 years as president of Peerless Cement Company, one of the firms that merged to form American Cement.

Mr. Fisher moves into the board chairmanship vacated by the resignation of Garner A. Beckett, American Cement Corporation, who continues as a board member.

Mr. Fisher, who became president of Hawaiian Cement in April, 1959, is vice-president of Cyprus Mines Corporation, a major stockholder in Hawaiian Cement Corporation. He succeeds Henry T. Mudd, of Los Angeles, resigned, on the board of directors.

Goforth Brothers, engaged in the rock, sand, and ready mixed concrete business at Williams, Calif., since 1945, have expanded their operations to include agricultural sulphur. This material is distributed through a new subsidiary company, Goforth Sulphur, Incorporated.

Production capacity of the Houck, Ariz., plant of the Arizona Silica Sand Company, Phoenix, has been expanded over 400 percent. The plant produces sand with nearly spherical grains, used in the oil industry.

A $390,850 contract for the construction of an adit and a raise at the quarry of its new cement manufacturing plant now under construction near Redding, Calif., was awarded to the Frazier-Davis Construction Co. of St. Louis, Mo., by Calaveras Cement Co., a division of The Flintkote Company.

Walter C. Russell, president of the American Cement Corporation, who was recently elected president of the Hawaiian Cement Corporation. He will continue to serve as head of American Cement while assuming his new duties.

Texas Gulf to Develop Utah Potash Deposit At Cost of $25,000,000

Plans have been announced for the construction of a new $25,000,000 potash mining and processing plant by Texas Gulf Sulphur Co., New York, N.Y., in the counties of Moab and Grand, in Utah.

The installation is expected to be completed by the end of 1963. However, some production is expected by the end of 1962. When completed, the plant will have an output of over 1.5 million tons.

Under the terms of an option with Delhi-Taylor Corporation, Dallas, Tex., on more than 42,000 acres of mining properties, Texas Gulf will pay $4,500,000 for the potash, plus a 25 percent net profit interest. Delhi-Taylor has completed an extensive drill coring project to prove a high-grade deposit large enough for commercial operation.

Lime Sold and Used in October, 1960

Lime sold and used in the United States, in October, 1960, totaled 1,004,509 short tons—an increase over the September output—according to reports by producers to the U. S. Bureau of Mines.

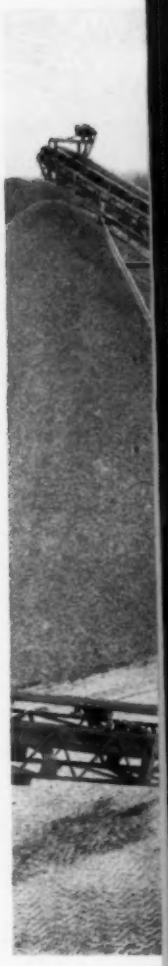
Agricultural, chemical, and other industrial lime increased, whereas decreases were noted in construction and refractory uses. Open-market lime constitutes approximately two-thirds of the total lime reported, and the remaining one-third is captive tonnage.

Lime Sold and Used by Producers[1] in the United States, in Specified Periods of 1959-60, by Types and Major Uses in Short Tons

	September	October		January-October	
	1960	1960	1959	1960	1959
By types:					
Quicklime	[2]745,980	780,691	495,333	7,768,035	5,749,383
Hydrated lime	234,109	223,818	185,851	2,298,719	1,735,251
Total lime	[2]980,089	1,004,509	681,184	10,066,754	7,484,634
By uses:					
Agricultural:					
Quicklime	4,301	5,190	4,219	49,097	57,024
Hydrated lime	5,995	5,368	5,578	86,365	93,929
Total	10,296	10,558	9,797	135,462	150,953
Construction:					
Quicklime	6,919	7,227	30,135	69,742	146,295
Hydrated lime	82,437	77,593	89,142	792,329	842,046
Total	89,356	84,820	119,277	862,071	988,341
Chemical and other industrial:					
Quicklime	[2]608,107	643,054	401,513	5,950,414	4,019,573
Hydrated lime	145,677	140,857	91,131	1,420,025	799,276
Total	[2]753,784	783,911	492,644	7,370,439	4,818,849
Refractory (dead-burned dolomite)	126,653	125,220	59,466	1,698,782	1,526,491

[1]The monthly canvass excludes the output of plants producing less than 10,000 tons a year. [2]Revised figure.

PICTURE OF EAGLE EXPERIENCE AT WORK



Eagle experience, and quality too, is at work in the plant of Hancock Sand & Gravel Ltd., Sunderland, Ontario, shown. The Eagle Washing-Classifying-Dehydrating Section is highly efficient, economical, makes money for them, "puts life into the sand", as they said. Like many producers in the U.S., Canada and elsewhere, they have found that there is a steady demand for Eagle Processed Sand.

We keep talking about experience because we have learned that while our equipment has been repeatedly copied, the years of experience we have had in the application of our equipment to meet the needs of aggregate producers is something that cannot be copied—it has to be acquired the hard way, which takes lots of time—and we have been at it a long time. There is a price on our equipment, but our experience is *priceless!*

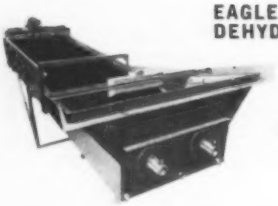
SINCE 1872
EIW
EAGLE IRON WORKS

We have cases where producers who have installed competitive equipment have turned to us for Eagle equipment to help them out of difficulties.

It is just as important to us to see that our equipment operates satisfactorily and produces maximum profits for the owner as it is for us to sell equipment. Only operating know how can assure this service. Get the fact-pact story—Send for Catalog.

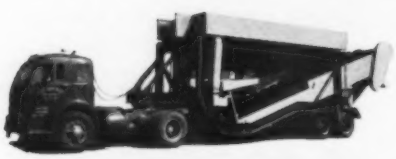
EAGLE IRON WORKS • 133 HOLCOMB AVE. • DES MOINES, IOWA

Experience shows up in every piece of



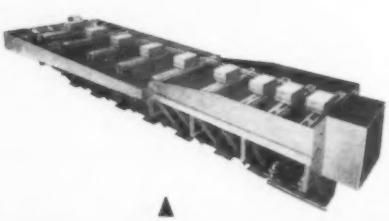
EAGLE FINE MATERIAL WASHER-CLASSIFIER-DEHYDRATOR

Experience has dictated many design improvements since Eagle introduced its first screw unit—water lubricated lower bearings, feed box designed to retain fines, screw flights with replaceable wear shoes, totally enclosed oil bath gear drive, 3-sided adjustable overflow weir—all Eagle developments. Complete capacity range of sizes in Single and Double Screw Units, up to 54" screw diameter.



EAGLE PORTABLE SAND SECTION

Easy to haul from pit to pit. Washes, classifies and dehydrates just like a stationary sand plant. Consists of Water Scalping-Classifying Tank and two Single Screw Washers. Both screws can produce one gradation of material or each can produce a different gradation simultaneously.

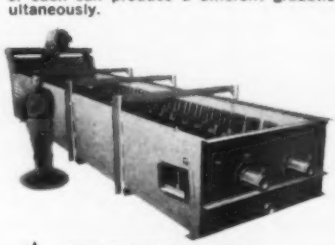


EAGLE WATER SCALPING-CLASSIFYING TANKS

Introduced by Eagle over 12 years ago—still in the lead with superior design—foolproof power-operated bleeder valves, easily adjusted metering splitter gates, easy flow multi-cell collecting-blending flumes and other features. Also smaller tanks for excess water removal exclusively.

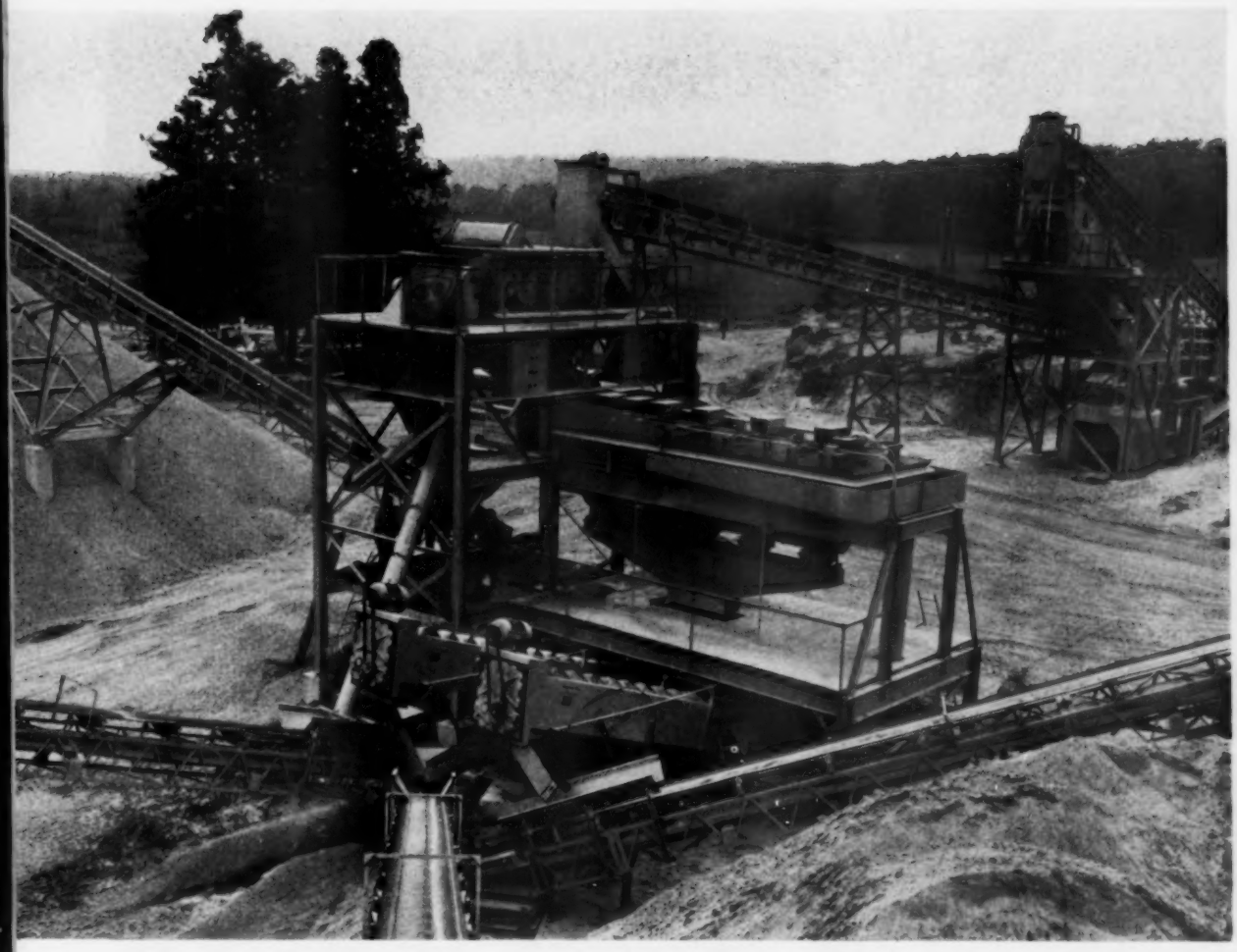
EAGLE COARSE MATERIAL WASHER-DEWATERERS

For washing and dewatering material up to 2"–2½" in dia. Corrugated paddles in pool area open up and abrade material, screw flights in drainboard area give thorough dewatering action. Totally enclosed oil bath gear drive. Single and double screw units.



SOL-CLAY WASHERS

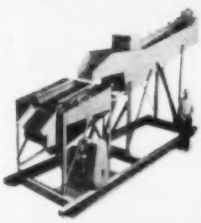
An all-paddle, double log washer that provides greater scrubbing action than the Coarse Material Washer. Washes gravel and stone up to 2½", removing soluble clays.



Eagle Aggregate Processing Equipment!

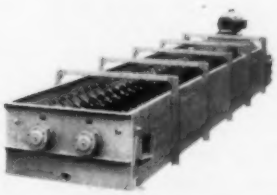
SLURRY REFUSE SEPARATOR ►

An adaptation of the Eagle Coarse Material Washer-Dewaterer with Trash Remover Tub End. In this Refuse Separator a slurry consisting of the silt and sand laden wash water is recirculated to aid in flushing out deleterious materials of light specific gravity. The overflow passes over a vibrating screen and the slurry goes to a sump for recirculating.



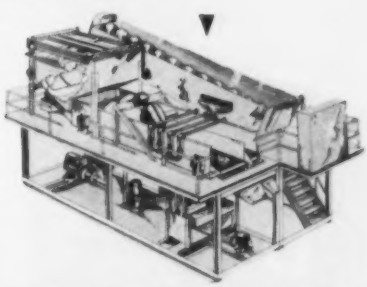
HEAVY MEDIA SEPARATION PLANTS

Most efficient HMS plant toady because it uses the patented OCC Separatory Vessel—provides continuous, positive separation of different specific gravity "float" material from the good "sink" material. Offered in stationary form or in 4 block sections for easy transporting and erecting, requiring only simple load bearing footings and minimum of electrical and pipe work.



EAGLE STABILIZED BASE MIXER ►

For plant mixing of stabilized base material, such as fine and/or coarse aggregate with required additives, aggregates with clay, and a variety of other mixes, including Portland cement and cold asphalts. Water, when used, added by metered volume control. Stationary and self-erecting portable models.



▲ EAGLE LOG WASHERS

Maximum scrubbing action on minus 4" particles. Scours and abrades gravel, crushed stone or ore. Puts plastic clay into solution, wears away friable foreign material, breaks up and washes away conglomerates. Paddles have renewable Ni-Hard wear resistant shoes. Non-deflecting tubular steel log shafts. Totally enclosed oil bath gear drive.

◄ EAGLE "SWINTEK" DREDGING LADDERS

Eliminate pumping delays and increase production. Traveling chain screens intake nozzle, keeps out boulders and debris which clog lines and cause pump damage. Cutter bars agitate deposit, increase intake of solids, cut through clay strata. Permit recovery from greater depths. Also Eagle All-Steel Dredges, Eagle Cutter Head Ladders and Eagle Dredge Hoists.

MORE PROTECTION

LESS STINK!

PLUS

300,000 PSI

FILM STRENGTH!

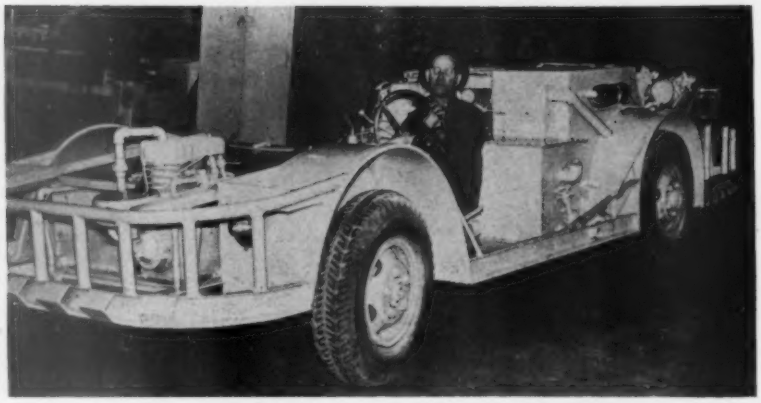
Check the advantages you get with D-A Rock Drill Lubricant:

- Special film strength additives protect up to 300,000 psi, prevent barrel scoring and cut rifle bar wear.
- No offensive odor, even in wet quarry, deep mine and tunnel operations where moisture causes ventilation problems when conventional EP additives are used.
- Extends drill life by preventing rust and corrosion during idle periods, even in deep mine, high-humidity operations.
- D-A Rock Drill 500—compounded primarily for the Joy TM500 Rock Drill—is especially valuable in *all* drills when high ambient temperatures exist.

Ask your D-A Representative for full details on D-A Rock Drill Lubricant, or write D-A for Bulletin RD458.

D-A LUBRICANT CO., INC.
1331 West 29th Street
INDIANAPOLIS 23, IND.

Enter 28 on card, page 169



● International Minerals & Chemical Corporation has avoided the controversy of front- versus rear-engine cars by building a car with the engine right in the middle. The 48-in. high service car works 900 ft. underground in International's potash mine at Carlsbad, N. M. The front end is used for an air compressor to furnish air for the tires of mining equipment and to supply pressure for the grease guns, mounted on the rear. This leaves the middle for the motor. Starting with a transmission and a diesel motor from an old jeep-type vehicle, the body and frame were fabricated in the maintenance shop of the mine.

Nov. Construction Awards Highest Ever for Month; Residential Total Improves

For the fourth month, after a year of depressed levels, future construction contracts awarded rose above year-earlier levels. November awards totaled $2,886,131,000—the highest level on record for the month, according to F. W. Dodge Corporation. (See table below.)

Sharp gains in all three major construction categories sent the total 22 percent above November, 1959. Contracts for nonresidential buildings and heavy engineering construction registered notable increases for the fourth month in a row, while residential building contracts exceeded year-earlier levels for the first time during 1960.

On a seasonally adjusted basis, the Dodge Index of construction contracts dipped slightly from the very high October figure to a November level of 280 (1947-49=100), compared with 294 in October and 271 in September.

In evaluation, Dodge economists said that the 22 percent gain was abnormally large, due to the steel strike, which held last year's figure down to a relatively low level. They added, "This should not obscure the fact that the current figures are the highest ever recorded for any November, providing a note of encouragement for business in general."

Once again, highway and bridge building increases sparked a rise in heavy engineering contracts.

The crew of the Universal Atlas Cement plant at Waco, Tex., has completed 850 consecutive days without a lost-time accident. In 1960 this plant completed its second consecutive year without a lost-time accident.

	November, 1960	November, 1959	% Change
Nonresidential	$ 915,683,000	$ 800,651,000	+14%
Residential	1,253,001,000	1,092,379,000	+15%
Heavy engineering	717,447,000	479,796,000	+50%
Total construction	$ 2,886,131,000	$ 2,372,826,000	+22%
	11 Mo. 1960	11 Mo. 1959	% Change
Nonresidential	$11,258,213,000	$10,611,838,000	+ 6%
Residential	14,248,557,000	16,164,806,000	—12%
Heavy engineering	8,135,845,000	7,292,686,000	+12%
Total construction	$33,642,615,000	$34,069,330,000	— 1%

Bureau of Standards Tests To Solve Critical Problem Of Hawaiian Cement Firms

Word that the U. S. Bureau of Standards will soon begin testing Hawaiian made cement was most welcome news to executives of the Hawaiian-made cement was most Kaiser Permanente Cement Company, the Islands' only cement manufacturers.

The decision to have the Bureau of Standards do the testing is expected to facilitate extensive use of locally produced cement throughout the Islands. Although the two Hawaiian plants together can produce three times as much cement as is needed in our newest state, about one-half of the volume sold there has been coming from the West Coast of the United States; and both companies were forced to close down because of oversupplies.

Continued use of stateside cement by local cement cement users was due to the fact that under former government regulations each batch of cement made in the two Hawaiian plants had to be tested individually in order to be passed for use on federal contract projects.

Since this ruling meant storing cement for federal projects in separate silos, an added expense for ready-mix producers, the Hawaiian-made cement was by-passed, and only imported cement was used. (The latter had blanket approval because it came from plants more than three years old.) Bureau of Standards testing should help put the surplus on the market.

Lehigh Valley Cement Firms Spend Millions to Purify Air

Companies comprising the Lehigh Valley (Pa.) portland cement industry have spent about $12 million for anti-pollution measures, according to Emmett Doherty.

Mr. Doherty, director of Lehigh Valley Air Pollution Control, stated that dust-collecting equipment is being used at plants of five cement manufacturers in the area—Dragon Cement Company at Northampton; Giant Cement Company, Egypt; Universal-Atlas Cement Company, Northhampton; Nazareth Cement Company, Nazareth; and Hercules Cement Company, Stockertown.

SIMPLIFY YOUR BUCKET ELEVATOR SPLICING WITH . . .

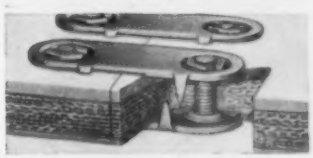
FLEXCO®

BELT FASTENERS

Installation at Ready Mixed Concrete Co., 908 West 25th Street, Kansas City, Missouri.

PERFORMANCE YOU CAN DEPEND ON: The bucket elevator belt shown above, furnished by Republic Rubber Co. of Ohio, was installed in March, 1959 to replace a belt on which there were 9 repair lap joints. The FLEXCO splice pictured is the original installation. Only a negligible amount of take-up has been required since it was put in service. Belt has handled approximately 150,000-200,000 tons of sand and concrete stone.

PROTECT YOUR INVESTMENT IN CONVEYOR BELTS WITH FLEXCO . . . the quality fastener for all heavy-duty conveyor belt applications: SAND & GRAVEL, CRUSHED ROCK, CONSTRUCTION EQUIPMENT, COAL & METALS, ETC.



Cutaway of a FLEXCO application showing the compression plates, teeth and precision-made bolts and nuts.

Available in Steel, Monel, Stainless, Everdur. Also promal top plates.

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TRUCK MOUNTED
CHAMPION
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DRILLMOBILE
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Drilling costs can be kept down only by carefully matching the drill to the job. With the experience gained in working with the industry's most complete range of drills, your Joy representative can show you how to cut drilling costs to the absolute minimum. For blast holes up to 12¼", he can furnish the drill and mounting which represent the proper combination of production efficiency and equipment investment to handle your job at the lowest possible cost.

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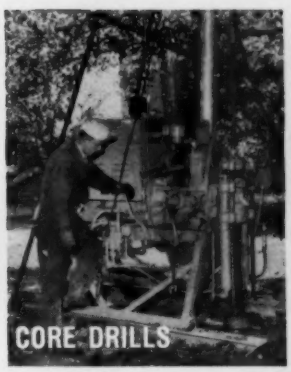
For small jobs, Joy can furnish hand-held, air leg or wagon drills with low equipment costs. Mass production of medium-sized holes can best be handled by one of the five types of Joy Trac-Drills, which provide as little or as much in the way of power controls as is justified by your operation. Where rotary drilling is practical, Joy truck-mounted drills will be the economical answer. Big blast holes can usually be drilled most economically with the big Joy Champion Rotary Drills.

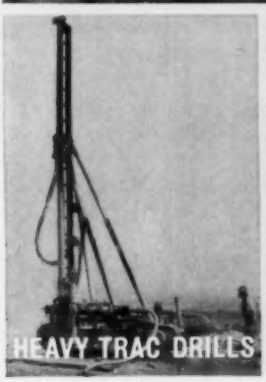
See your Joy representative whenever you have a drilling job to be done. He can give you the right equipment at the right price to make you money. For more complete information on the Joy line of drills, write for Bulletin 2825-26.


CORE DRILLS

HAND HELD

DRILL MOBILES

TRAC DRILLS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In Canada: Joy Manufacturing Company (Canada) Limited, Galt, Ontario

You can reduce your equipment investment because this D-120

pusher-dozer

can be converted into a tractor-shovel

Now you can buy a big, powerful rubber-tired tractor for bulldozing, push-loading or towing, with or without an optional package for converting the unit into a tractor-shovel.

This new D-120 PAYDOZER, in addition to its convertibility, has numerous engineering and design features which result in outstanding performance and ease of operation.

More power: Weighing 55,000 lbs., the D-120 is powered by a 300 hp. turbo-charged diesel which gives it a higher horsepower-to-weight ratio than other machines of similar size.

Better balance and stability: Approved and exclusive use of dry ballast in all four tires gives better weight distribution and lower center of gravity – dampens tire bounce and permits better blade control.

Inside push arms: Unlike crawler-mounted dozers, all rubber-tired units have push-arm brackets mounted on the main frame. The D-120 push-arms, however, are located inside front wheels, close to main frame for the most direct transfer of forces and the least strain. This also gives greater accessibility to the front wheels for hub and tire servicing.

"Full" power-shift transmission: Hough-built, this unit does not require stopping for range shifts. It is a full-reversing, constant-mesh type with four speed ranges, up to 26 mph., in both forward and reverse.

Matched torque converter: This is *not* a compromise converter for both dozer and shovel application. Instead it is designed specifically for bulldozing and makes fullest use of the tremendous engine power to develop maximum tractive effort. A torque-converter change is part of the bulldozer-to-shovel conversion package.

"Power-transfer" differentials: Provided on both axles for the best possible traction. When one wheel is capable of more tractive effort than the other on the same axle, it can automatically receive 38% more torque.

PAYDOZER is convertible to this H-120 PAYLOADER

"Three-way" power blade control: The D-120 blade is 12′-4″ wide at the cutting edge and 4′-8″ high. Adjustable from 1′-6″ below grade to 3′-2″ above; pitch adjustment of 35 degrees and blade tilt of 10 degrees on either side.

Hydraulic features: The system is closed and pressure-controlled to exclude air-borne dirt and foreign matter. Transmission and torque-converter oil is kept cool by a separate fan-cooled radiator.

Ease of operation: In addition to power-shift transmission there are twin hydraulic steering booster rams, and 4-wheel power air brakes with "Operator's-choice" brake controls – exclusive in its class. These dual foot pedals permit choice of braking with or without transmission engaged for any operating situation.

Standard equipment: Included are open-type cab, front and rear windshields and wipers, special lights and swinging draw-bar. Standard tires are 26.5 x 25 with 29.5 x 25 tires optional.

THE FRANK G. HOUGH CO.
750 Sunnyside Ave., Libertyville, Ill.

Send full data on the Model D-120 PAYDOZER

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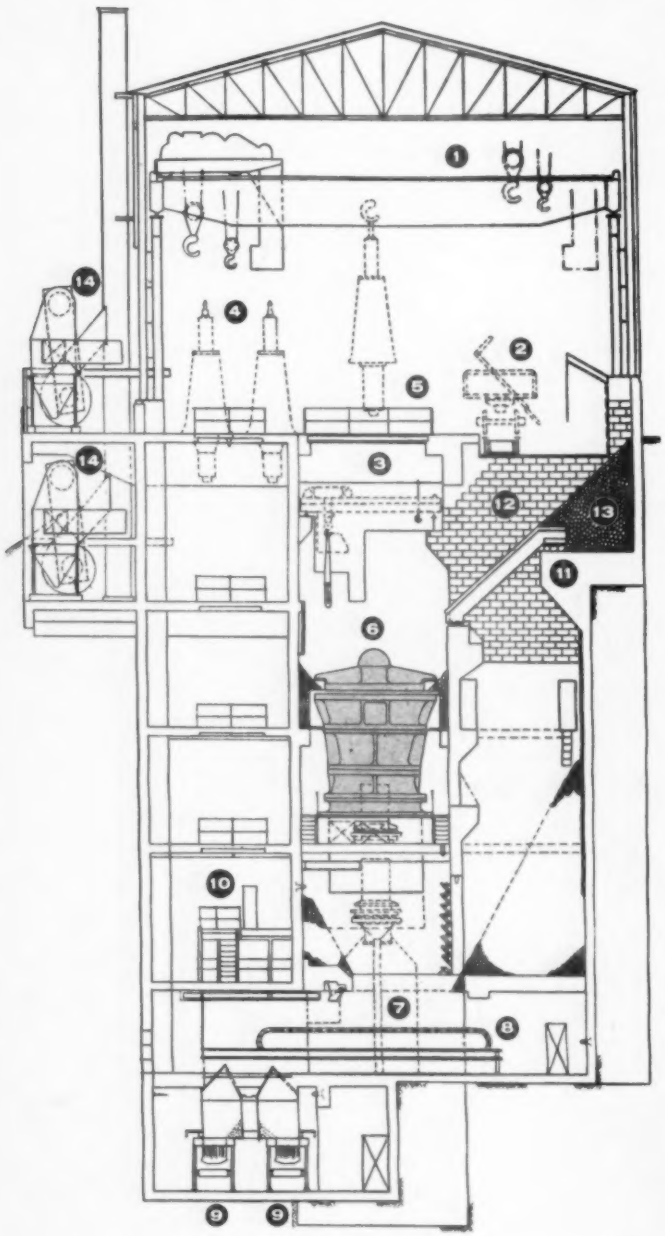

TRAYLOR

world's largest manufacturer of 60″ gyratory crushers designed and built this giant for installation in Peru.

The Southern Peru Copper Corporation called on Traylor-made ECONOMY, EFFICIENCY, AND CAPACITY to handle the tremendous crushing workload at its new plant in Toquepala, Peru.

Drawing shows Traylor 60″ gyratory crusher operation:

1. 100-ton crane with 25-ton auxiliary hook and operator's cab
2. 43-cu. yd. side-dump mine car
3. 20-ton crane with rock hook
4. Mantle storage
5. 18 x 22-ft. removable hatch
6. 60-in. Traylor gyratory primary crusher
7. Hydraulic hoist, 14-ft. lift, 25-ton capacity
8. Two 72-in. pan feeders
9. Two 54-in. chain-belt conveyors
10. Electrical control panel
11. 8-in. grizzly
12. 2-in. plate liners
13. Dead-bed areas
14. Air filter dust removal unit

Other Traylor Crushers made for primary, secondary or fine reductions. Write today outlining your crushing requirements and let Traylor's engineers make recommendations . . . or ask for Bulletin No. 1126.

TCA-9

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NOW! A SCREEN WITH A

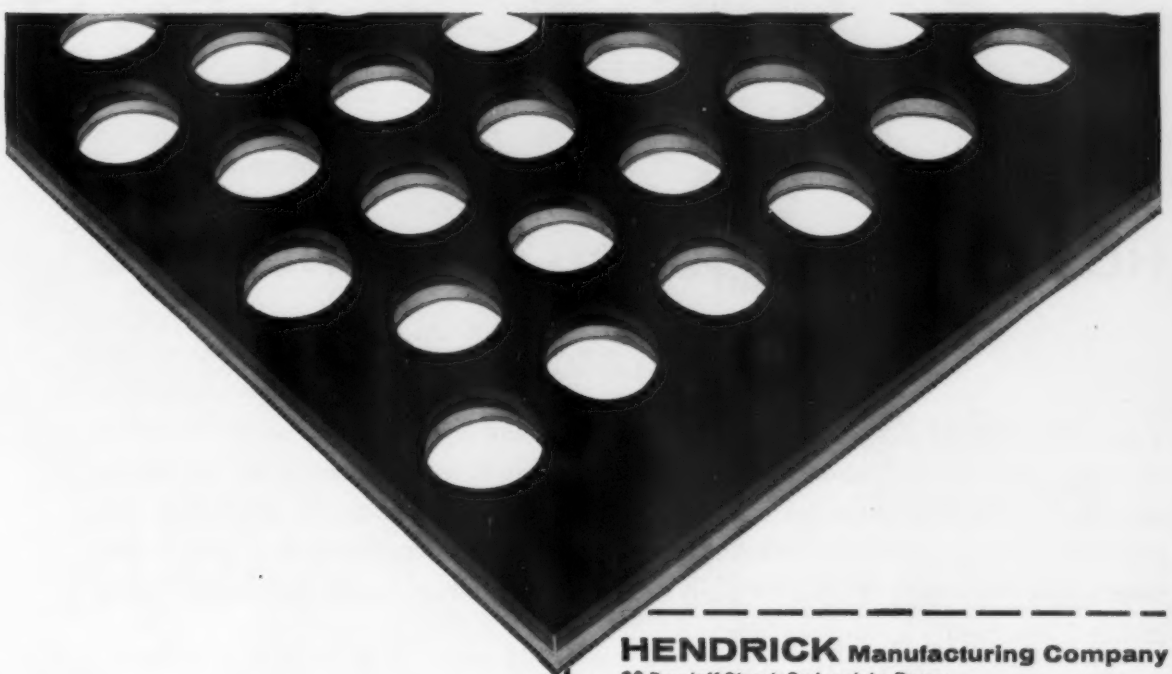
rubber bumper

HENDRICK RUBBER CLAD PERFORATED METAL is now available with a specially designed rubber covering. Ideal where extreme abrasion is a problem, rubber clad Hendrick Perforated Screens assure far less plate wear. Large chunks of ore, coal or stone hit the screen with a fully cushioned shock... the rubber coating also takes the brunt of wear by protecting the steel plate underneath. The rubber laminate is bonded to steel by a new adhesive and vulcanized under controlled heat.

For more details contact your local Hendrick representative or mail in the coupon direct.

HENDRICK Manufacturing Company
Carbondale, Pennsylvania

PERFORATED METAL SCREENS • WEDGE WIRE SCREENS • CASCADE WEDGE WIRE SCREENS
WEDGE SLOT SCREENS • RUBBER CLAD PERFORATED SCREENS • FLANGED LIP SCREENS
FLIGHTS • SHAKER AND CONVEYOR TROUGHS.



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39 Dundaff Street, Carbondale, Penna.

Gentlemen: I would like to learn more about Hendrick Rubber Clad Perforated Metal Screens.

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☐ Please send FREE literature.

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THE USEFULNESS OF A LIMA

HOW TO KEEP A JOB ON SCHEDULE

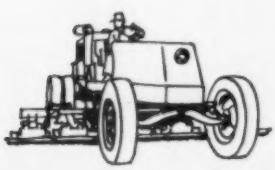
You need machines that work . . . and *keep* working! Nothing's more useless than a shovel or crane that's "down" when you need it most. Limas have a reputation for staying on the job. They're predictable because they *do* the work you schedule for them. You can count on them. Limas are better built, better engineered for dependable high production, trouble-free operation; favored by users everywhere to outdig, outlift and outlast other makes. Lima quality features include:

- Precision air control—insuring maximum production under the most adverse conditions; permitting feel of the load, instant response.
- Antifriction bearings at all important bearing points, including drums, brake and clutch housings.
- All gears, smaller parts and shafts are flame or induction hardened for longer life.
- Versatility—insuring *plus* value. Limas are not adaptations of single-purpose machines. Each is designed and built for top efficiency, long life with any front end.
- Design flexibility assuring complete transportability; easily dismantled to legal weights.

Call your Lima distributor and arrange to see a Lima at work. Or write us for details.

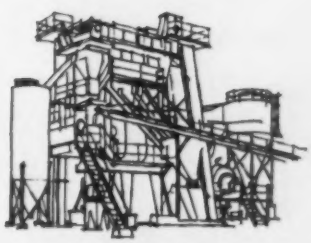
6101

There's a Lima type and size for you—shovels to 8 yd.; crawler cranes to 140 tons, truck cranes to 80 tons, wagon cranes to 75 tons; draglines variable. Interchangeable front ends. Gasoline, diesel or electric power.



LIMA MODEL D ROADPACKER —Six vibrating shoes consolidate fast, deep for profitable single-course construction; available in 12-shoe Super model.

LIMA AUSTIN-WESTERN portable and stationary crushing, screening and washing equipment; including jaw crushers, roll crushers, feeders, screens, elevators, conveyors, bins.



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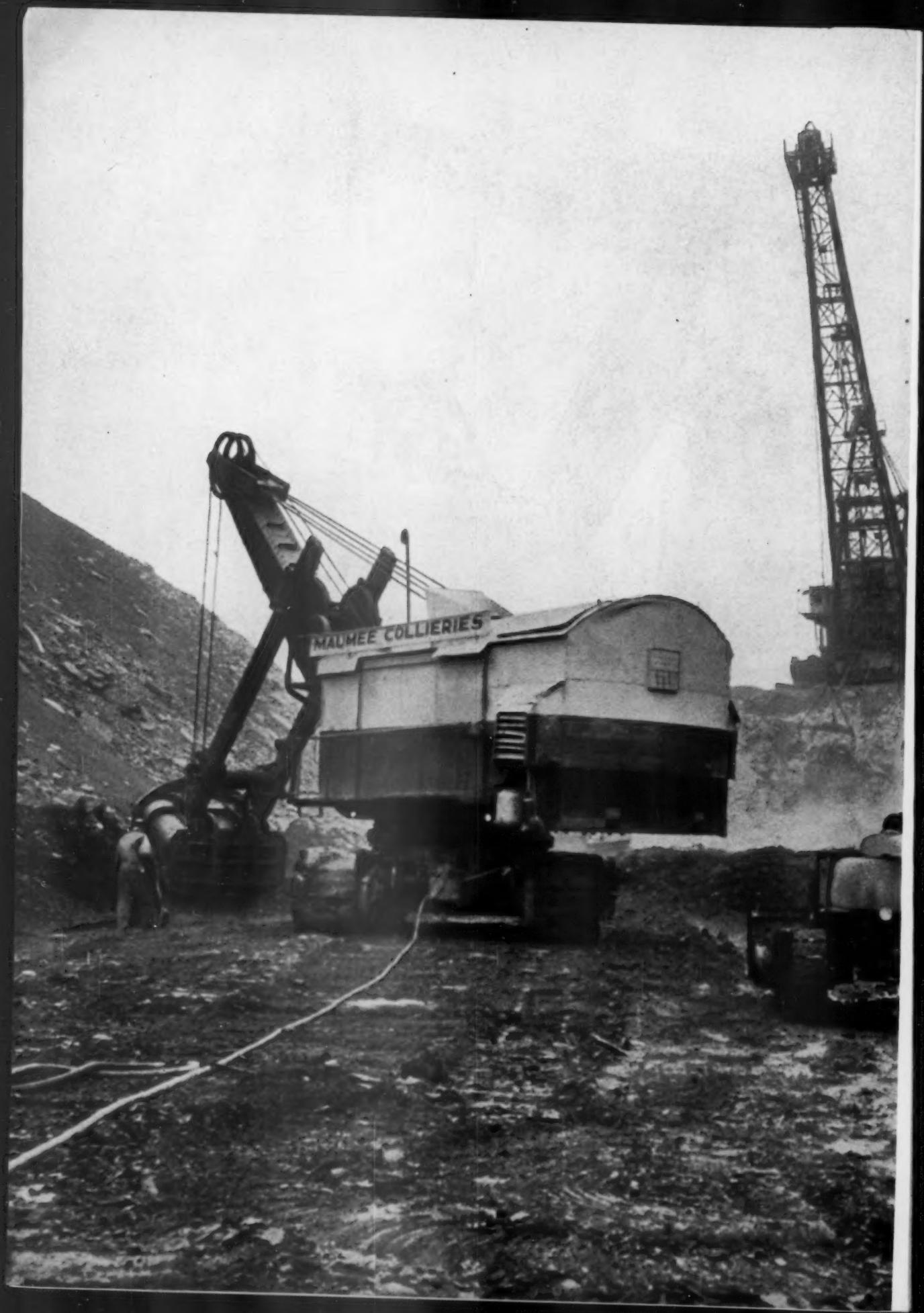
MAUMEE COLLIERIES

At the Maumee Collieries in Indiana...

ANACONDA SHOVEL CABLE HAS A RECORD: 10 YEARS ON THE ROCK PILE!

Anaconda's SH-D Cable gives many years of dependable service in spite of heat, moisture, kinks, rocks and runovers!

How many shovel cable hazards can you count in this picture from the Maumee Collieries? Rocks . . . moisture . . . kinks . . . danger of runovers—they're all there. Yet the first installation of Anaconda's rugged SH-D Shovel Cable has resisted them all—*for 10 long years!*

It's proof again of the way Anaconda's in-the-field experience with Shovel Cable pays off in a superior cable for you. The important knowledge gained from use and testing of SH-D Cable *on the job* in our own mines goes into the design and manufacture of Anaconda Shovel Cable.

For example, the insulation is Anaconda Butyl (AB). Nothing can beat it for withstanding ozone, heat and moisture. Patented rubber cores cushion the ground wires and help prevent breaks from kinks and runovers. SH-D has a neoprene jacket that is exceptionally tough and abrasion-resistant. And every design, every component has been job-tested—your assurance of superior quality and performance.

Call on the Man from Anaconda with your cable problems. Or see your local Anaconda distributor. For new descriptive Bulletin DM-5818, "Anaconda Securityflex Portable Cables for the Mining Industry," write: Anaconda Wire & Cable Co., 25 Broadway, New York 4, New York.

50212

◀ For a decade, the Anaconda SH-D Shovel Cable you see here has been giving dependable service for the Maumee Collieries, Jasonville, Indiana. Its many superior design features enable it to resist on-the-job hazards that would knock out ordinary shovel cables.

ASK THE MAN FROM

ANACONDA®

FOR **SHOVEL CABLE**

Enter 38 on card, page 169

CUT COSTS *LESS DOWN TIME AND UP-KEEP*

GIORDANO BROS. of MARKHAM, ONTARIO operate this diesel-electric Telsmith 367 Portable closed circuit crushing-screening plant. Plant mounted 60 KW Generator powers individual electric motors on conveyors and screen; simple push-button control—cut power and up-keep costs. (*Below, lower left*) Control cabinet with 3 receptacles for powering stock piling conveyors.

...get HIGH CAPACITY crushing and PRODUCT FLEXIBILITY

Crushing over 215,000 tons of granular road building material in two years, this Telsmith Portable closed circuit crushing-screening plant has had practically no down time; its single 367-S Gyrasphere Crusher still has its original manganese steel liners. ● Plant capacity is high—up to 300 tph. ● Its 367 Gyrasphere has a big ratio of reduction—7″ feed down to ⅝″, with little oversize. ● The big 4-bearing, 4′ x 12′, 2½ deck Vibrating Screen can make 3 product sizes in one pass. Sizes may be blended by simple adjustment of under screen gates. ● Crusher; Screen; 30″ conveyors, adjustable stroke Plate Feeder; Feed Hopper with removable grizzly; non-slip 84″ x 24″ Rotary Elevator—*all Telsmith heavy duty* units, the same as used in permanent plants to insure the low cost, profitable service today's commercial producers demand. For full details, get illustrated Bulletin 276. P-24-161

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United Materials, Inc. Formed by Four-Way Merger

United Materials, Inc., a new aggregates firm, has been formed at Phoenix, Ariz., by the combination of four companies: Superior Sand and Gravel, Phoenix; Tempe Equipment, Tempe; Avondale Sand and Rock, Avondale; and Coolidge Sand and Rock, Coolidge.

Officers are John F. Fisher, president, Phoenix; Elmer D. Clark, executive vice-president and general manager, Phoenix; Robert W. Evans, treasurer, Tempe; and Ethel F. Sullivan, secretary, Phoenix.

Each of the member companies is transferring certain assets to the new organization, which will be wholly owned by its employees. The firm will mine, process, manufacture, and sell sand, stone, ready mix, and asphaltic concrete, prestressed concrete, and other building materials.

First expansion activities are planned for the facilities at Mesa, Ariz.

New N.L.I. Liming Circular Urges Treating Acid Soils

One of the newest pieces of promotional literature now available is the circular entitled *Is Your Fertilizer Dollar Being Cut in Half on Lime Deficient Soils?* This is a publication of the National Limestone Institute, Inc., Agricultural Limestone Division.

Provision is made for printing the producer's name, address, and telephone number on the leaflet.

The circular is available at $22 per 1,000 plus postage, from the institute, 210 H Street, N. W., Washington 1, D. C.

3rd Symposium Scheduled On Automation in Processing

The third annual Symposium on Pilot Plant and Process Automation will be held April 5 and 6, 1961, at the Ambassador Hotel in Los Angeles.

This annual meeting was conceived (in 1959) to meet the need for an informal exchange of information on automation, measurement, control, and process analysis among users in the process industries.

This year the name of the symposium has been changed slightly from Symposium on Pilot Plant Automation to Symposium on Pilot Plant and *Process* Automation to describe its nature more adequately. The 1961 sessions will again be sponsored by a group of instrument and automation equipment suppliers: TRW Computers, Daystrom, Consolidated Systems, and Robertshaw Fulton Controls. The program will be arranged and controlled entirely by a committee of users. This year the committee represents Phillips Petroleum, the University of Arkansas, Celanese, Esso, and DuPont.

Discussion emphasis will be on actual case histories and practical applications with details on the performances of equipment and techniques. Practicability will be the theme. Dan L. McGurk of Thompson Ramo Wooldridge Computers is symposium director.

Potomac Sand & Gravel Co. Formed as Dravo Subsidiary

A new subsidiary, the Potomac Sand and Gravel Co., has been formed in Washington, D. C., by the Dravo Corporation, Pittsburgh, Pa., and Charles P. Maloney,Washington businessman.

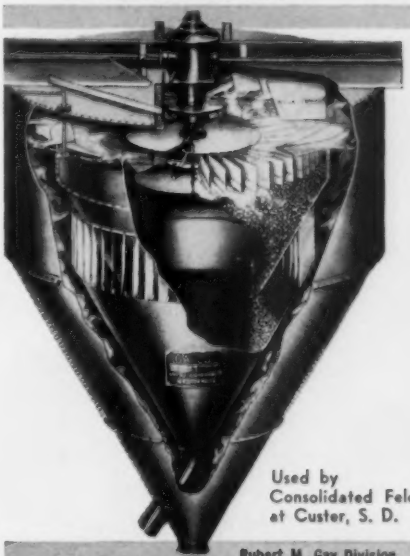
Potomac Sand and Gravel has purchased the production equipment and plant, as well as the dredging rights of the 60-year old Smoot Sand and Gravel Corp. Dravo owns majority interest in the new concern and will manage the business.

Two Phoenix Firms Merge Under Ariz. Sand & Rock Name

Operations of the Arizona Sand and Rock Company and Phoenix Concrete Company (both of Phoenix, Ariz.) have been combined in one new organization. However, the official name for the concern will be that of the former firm.

U. V. Dorais, formerly vice-president and general manager of Arizona Sand and Rock, is the executive officers for the merged operations; D. E. Muir, who was vice-president and general manager of Phoenix Concrete, is the vice-president of the new organization.

USING SCREEN SEPARATIONS? NOTHING CLASSIFIES AS PERFECTLY AS AIR



Used by Consolidated Feldspar at Custer, S. D.

GAYCO
CENTRIFUGAL AIR SEPARATORS

Classify practically all dry fine materials

You get:
- CLOSER SEPARATIONS
- IMPROVED PRODUCTION
- NO UNDESIRABLE OVERSIZE.

RANGE 60 to 400 mesh.
Timken bearings.
Choice of Standard or Heavy-Duty Models.

this helpful booklet sent on request

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Factory and Laboratory: Kingston, N. Y.
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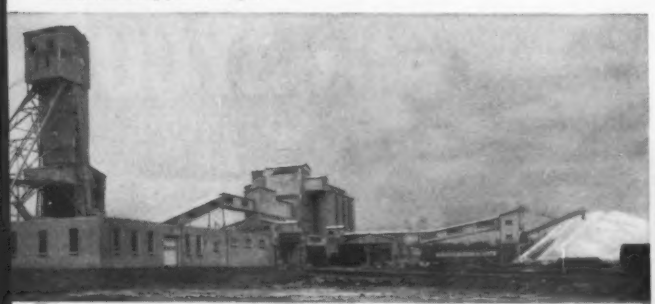
Enter 42 on card, page 169

Pass the salt...

from 2,000 feet below Lake Erie

...a job for USS Tiger Brand

Fairport Harbor Mine of the Morton Salt Company showing skip hoist at left and processing plant at right.



Rock salt discharges from the skip into a hopper and then flows on to a conveyor leading to the processing plant.

Skip hoist equipped with two Tiger Brand wire ropes. Two skips operate simultaneously—one discharges at the top while the other loads at the bottom.

The deepest salt mine in the United States is located at Fairport Harbor, Ohio, about 25 miles northeast of Cleveland. It taps a vast bed of salt 2,000 feet below the surface and extending far under Lake Erie. This is the first mine of its kind built in this country in the last 25 years. The shaft is deeper than the height of the Empire State Building.

Geologists estimate that the high-grade rock salt in this location will last over 200 years. The Morton Salt Company of Chicago, developers of the mine, aim to produce about 500 tons of salt an hour. All of it will be used for industries in the East and Midwest and for spreading on highways and sidewalks in winter.

USS Tiger Brand Wire Rope forms the vital connecting link between the salt bed and the surface. Two huge skips, shaped like rockets, have a capacity of 16 tons each and make 31 trips per hour. They are hoisted at a rate of 1,380 feet per minute by two Tiger Brand $2\frac{1}{8}$" dia. Special Mine Hoist Ropes 2,580 feet long. These ropes provide the strength, fatigue and abrasion resistance necessary for safe and economical service. To prevent corrosion from the salt, the ropes are thoroughly lubricated at the factory and are relubricated every month at the mine.

Why USS Tiger Brand is your best buy. Tiger Brand Wire Rope is designed by one of the industry's most capable staffs of wire rope engineers. It is made by a company that maintains the most complete research and manufacturing facilities in the steel industry. When you buy Tiger Brand you get the right rope for the job. And your installation is no further away than a phone call from experienced American Steel & Wire field service representatives.

For more information, write American Steel & Wire, 614 Superior Ave., N.W., Cleveland 13, Ohio.

USS and Tiger Brand are registered trademarks

USS **American Steel & Wire Division of United States Steel**

Columbia-Geneva Steel Division, San Francisco, Pacific Coast Distributors
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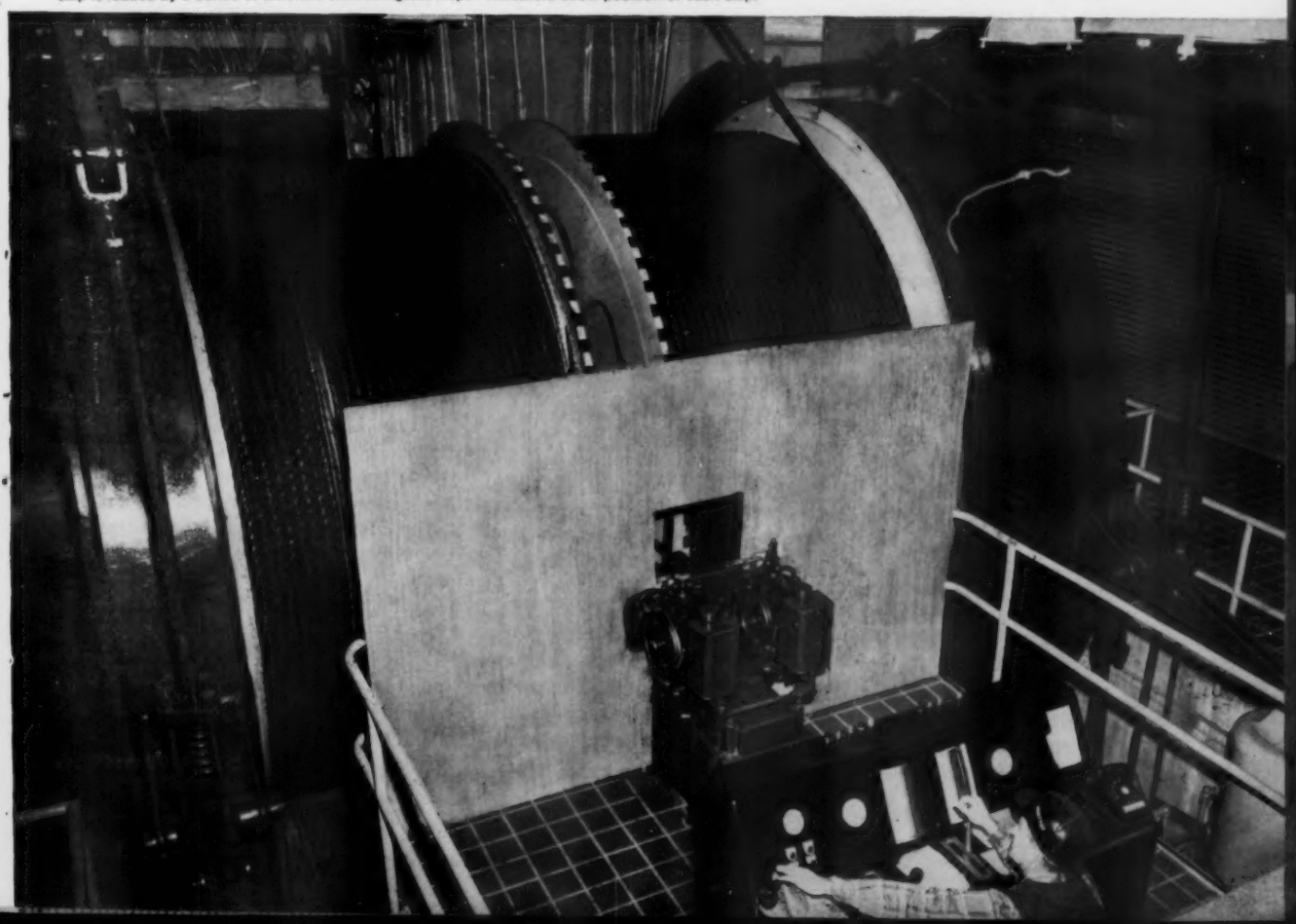
Wire Rope

USS Tiger Brand Wire Rope on the huge 12-foot diameter skip hoist drums. Skip operator can tell when skip is loaded by a series of different colored lights. Depth indicators show position of each skip.



Coalinga Asbestos Co.—New Operating Concern—To Process Big Deposit

Johns-Manville Corporation and the Kern County Land Company of San Francisco have announced plans to place in commercial production a 1,500-acre high-grade asbestos deposit at Coalinga, in the Diablo Mountains of central California. The deposit is at an altitude of about 4,000 ft.

Claims and leases covering this acreage were acquired by the Kern County Land Company.

A new operating company, to be known as the Coalinga Asbestos Company, Inc., has been formed jointly by the two firms, with Johns-Manville in control of the majority interest. Plans call for the erection of a mill to process a high-quality asbestos fiber for the manufacture of asbestos-cement, asphalt-asbestos, and vinyl-asbestos products.

The new Coalinga mine, 160 miles southeast of San Francisco and 190 miles northwest of Los Angeles, will produce ore for the new mill by surface mining methods.

Official Approval Given On Marquette-N. Amer. Deal

Marquette Cement Manufacturing Company shareowners have approved the previously announced plan to acquire North American Cement Corporation. Also approved was an increase in Marquette's authorized common shares from $3,000,000 to $4,000,000.

The following new directors were elected to the Marquette board: Albert M. Andreas, a director and chairman of the board of North American; Jansen Noyes Sr., partner, Hemphill, Noyes & Co. and a director of North American; and Henry L. Hillman, president of Pittsburgh Coke & Chemical Company.

All top-level administrative, selling, and operating personnel of North American will be retained by Marquette. Perry Andreas will continue as president and top-level coordinator of sales and operations for North American's eastern plants.

It was indicated that large-scale modernization work involving an expenditure of $11,000,000 is contemplated for the Catskill (N. Y.) plant of North American. Objectives will be to achieve the lowest possible production cost and a 50 percent increase in the capacity of the Catskill plant. North American also operates plants at Howe's Cave, N. Y., and Security, Md.

1960 Asphalt Production Termed Largest in History

L. P. Street, American Bitumuls & Asphalt Company, Baltimore, was elected chairman of the Asphalt Institute at the recent annual meeting of the board of directors. He succeeds E. M. Stone, Empire Petroleum Company, Denver in this post.

L. B. Fox, Mobil Oil Company, New York, was named treasurer, succeeding J. J. Tumper, Witco Chemical Company, New York, who has retired.

During an address given by the president of the organization, Dr. J. E. Buchanan, it was stated that a new all-time high tonnage—more than 21.5 million short tons—of asphalt had been produced during 1960. This figure would represent a 3 percent increase over the 20.9 million tons marketed in 1959.

The mid-year meeting of the institute will be held on June 21 and 22 at the Hilton Hotel, Denver; and the 1961 annual meeting will be held in Washington.

Safety Course Given by Mail By National Safety Council

A study-by-mail safety course for industrial foremen, developed by the National Safety Coucil, is solving the problem of keeping key men on the job while they acquire the necessary safety know-how.

Emphasizing the basic points of accident prevention, the course provides supervisory safety training during a foreman's at-home hours.

The course has been pre-tested by foremen in all types of industry.

Further information on the home study safety course may be obtained from Len Smith, director of industrial training, National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill.

Accident Costs Revealed In N.C.S.A. Report on Survey

Safety Makes Sense=Dollars, a recent publication of the National Crushed Stone Association, is the report to members on the N.C.S.A. survey of accident costs.

It opens with this startling statement: "During the next 12 months, N.C.S.A. statistics indicate that one out of every four of your employees will require first aid or medical treatment for a work injury!" Then this—"The average direct cost for each disabling work injury is over $800!"

The survey revealed that members spend almost $1 million a year in premiums for workmen's compensation insurance. This amounts to an average premium of about $72 per employee. Adding other costs, it was determined that N.C.S.A. member-companies are spending in excess of $2 million annually for plant accidents.

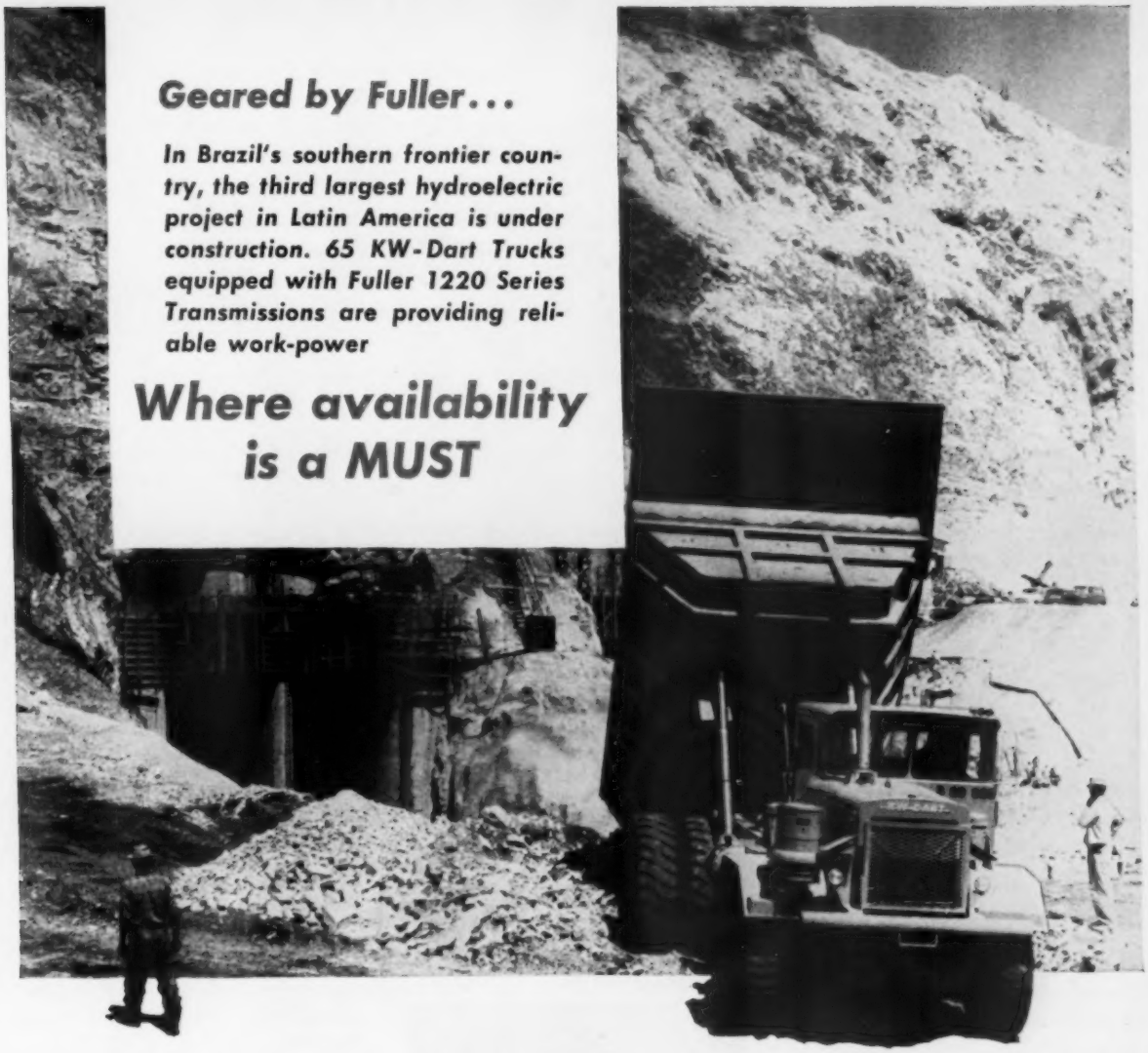
To state the loss in terms of sales —the N.C.S.A. (active) members are losing the profits from about $4,000 worth of crushed stone sales for each injured worker.

A sales office has been established by International Minerals & Chemical, S.A., at Santurce, Puerto Rico, to serve industry in Latin America and the Far East. Luis Vergne of Puerto Rico will be managing director.

The request of the Missouri River Sand & Gravel Co., Boonville, Mo., to build a wharf on the river has been approved by the Army Corps of Engineers. The structure will extend 35 ft. into the river and will be 125 ft. long.

The American Gypsum Co., Albuquerque, N. M., is now in full-scale operation. The firm went from groundbreaking to initial production in a little over eight months. Since November the firm has shipped products to Arizona, Colorado, Texas, Wyoming, and New Mexico.

The Universal Atlas Cement plant at Independence, Kans., shut down since November, has reopened. About 140 men have returned to work.



Geared by Fuller...

In Brazil's southern frontier country, the third largest hydroelectric project in Latin America is under construction. 65 KW-Dart Trucks equipped with Fuller 1220 Series Transmissions are providing reliable work-power

Where availability is a MUST

To harness much of Brazil's tremendous water power potential, Central Eletrica de Furnas is building a 400-foot-high dam across the Rio Grande River. Completion date for the dam, which will create a reservoir 150 miles long, was originally set for 1965, but an earlier finish is now in sight.

Contributing greatly to the accelerated construction schedule are 65 Fuller-geared KW-Dart Trucks used on the project. 55 of the KW-Darts are Model 25SL, 25-ton dump trucks equipped with 320 hp diesel engines and Fuller 10-F-1220 10-speed Transmissions. The remaining ten are heavy-duty KW-Dart Diesel Tractors, seven of which are equipped with 10-F-1220s and the other three with Fuller 5-F-1220 5-speed Transmissions. The tractors are used to transport cement and move heavy equipment.

Working more than 6,000 miles from Kansas City, Mo., where they were built, the trucks were selected because of the dependability of their component parts. Reports from the project site indicate that the heavy-duty Fuller Transmissions in the mountain-moving fleet have been instrumental in the trucks' excellent record of performance and availability on one of the world's most dramatic construction jobs.

Ask about the Fuller Transmission designed for *your* operation.

FULLER TRANSMISSION DIVISION

EATON MANUFACTURING COMPANY

KALAMAZOO, MICHIGAN

Sales & Service: West. Dist. Branch, Oakland 6, Cal. • Southwest Dist. Office, Tulsa 3, Okla. • Automotive Products Co., Ltd., Brock House, Langham St., London W.1, England, European Rep.

Garvin, V-P, Operations Succeeded by L. J. Mueller At Standard Lime-Cement

W. D. Garvin, who was vice-president in charge of operations for Standard Lime and Cement Company, Baltimore, Md., retired on December 31, 1960, after 35 years of service. He joined the firm in 1925 as a chemist at the Millville laboratory, and was placed in charge of operations in November, 1954, when the firm was acquired by the American-Marietta Company.

L. J. Mueller was named to succeed Mr. Garvin. Mr. Mueller joined Standard in June, 1936, as a mining engineer and was appointed assistant vice-president of operations in December, 1959. He will continue to serve in his present post as vice-president in charge of operations for Dragon Cement Co.

W. D. Garvin (left) has retired as vice-president operations, Standard Lime & Cement Co. L. J. Mueller (right) succeeds him in this post.

Glen Canyon Dam Project Starred in Color Film

Bridge to the Future — International Harvester Company's second film salute to the building of the gigantic Glen Canyon Dam in northern Arizona—was premiered at the annual convention of the National Reclamation Association in Bakersfield, Calif.

The 30-minute, 16-mm., color-sound production delineates the intermediate phase of work being performed under the largest single prime contract award in the history of the U. S. Bureau of Reclamation —a $108 million undertaking underwritten by Merritt-Chapman & Scott Corporation.

A plant to process clamshells dredged from Lake Pontchartrain into lime products has been opened by the United States Gypsum Company at New Orleans, La. Shells are washed, heated in a 250-ft. long kiln to a temperature of 2,000 deg. F., and ground into one of three lime products—quicklime, hydrated lime, and building lime.

The Pilot Rock plant, Pendleton, Oreg., of United States Gypsum Company received the American Hardboard Association award of honor for the company's outstanding safety record in 1960. Through October the plant had operated 557 days without a disabling injury.

LESLIE D. FAIN, Alexandria, La., was recently elected a vice-president of Texas Industries, Inc. Mr. Fain has been general manager since 1951 of the two Texas Industries companies headquartered in Alexandria—Central Culvert Corporation and Louisiana Lightweight Aggregate Company.

• • •

• Reese B. Lloyd, who was recently elected president, chief executive officer, and a director of the Warner Company. Mr. Reese was formerly an executive on the staff of the Heintz Division of Kelsey-Hayes Company, Philadelphia.

Pennsylvania Producer's Flier Lists Products, Supplies Map

The management of Pottstown Trap-Rock Quarries, Inc., Sanatoga, Pa., is using an original and helpful flier to show potential customers the exact location of its two plants—at Sanatoga and Stowe, Pa.— and to list the products offered at each.

On one side of the sheet the crushed stone products are listed; on the other side is a well marked map of the Pottstown area, showing the sites of the two newly modernized plants.

Distribution Silos Planned For Peerless Cement Co.

A $500,000 expansion program involving the construction of new bulk cement storage and distribution silos has been initiated by the Peerless Cement Company in Grand Rapids and Schoolcraft (near Kalamazoo) Mich.

Locations for the new distribution centers were selected on the basis of proximity to expanding markets and accessibility to both rail and truck transportation routes.

The first cement carrier in Norway, the 1,100-ton M. S. *Cementine*, has been delivered to A/S Dalen Portland Cementfabrikk by the Langesund Shipyard.

• Correction

The gentleman in the photograph on page 100 of this issue is erroneously identified as president of M.L.P.A. Mr. Cullor is the association's new vice-president.

Enter 47 on card, page 169 →

2200 HOURS OF WORK– NOT ONE MINUTE OF DOWN TIME

2200 hours of trouble-free service. That's the record established by this D7D Tractor since its delivery last May to the Calera Quarry in Birmingham, Alabama, a division of the Vulcan Materials Co. The machine handles stockpiles, working two eight-hour shifts, five days a week.

There are several reasons behind this dependable service. Consider, for example, the tractor's Caterpillar lifetime lubricated track rollers. Bigger and stronger than former D7 rollers, they *never* need attention until rebuild time—*and rebuild time is a long time coming.*

The tough undercarriage is only one important feature of the new D7 . . . there's a 140 HP CAT TURBOCHARGED ENGINE that pushes blades full of rock with only ounces of fuel . . . there's an exclusive CAT OIL CLUTCH that will outlast any dry-type clutch . . . there's a PRESSURE-LUBRICATED POWER TRAIN that ignores shocks and heavy loads, keeps the tractor producing season after season . . . and there are other features like the new DRY-TYPE AIR CLEANER that takes out *at least* 99.8% of all dirt even under the worst conditions, and takes only about five minutes to service.

A new D7 could be the tractor you need in your operations . . . talk it over with your Caterpillar Dealer . . . there's no better place to invest equipment dollars.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

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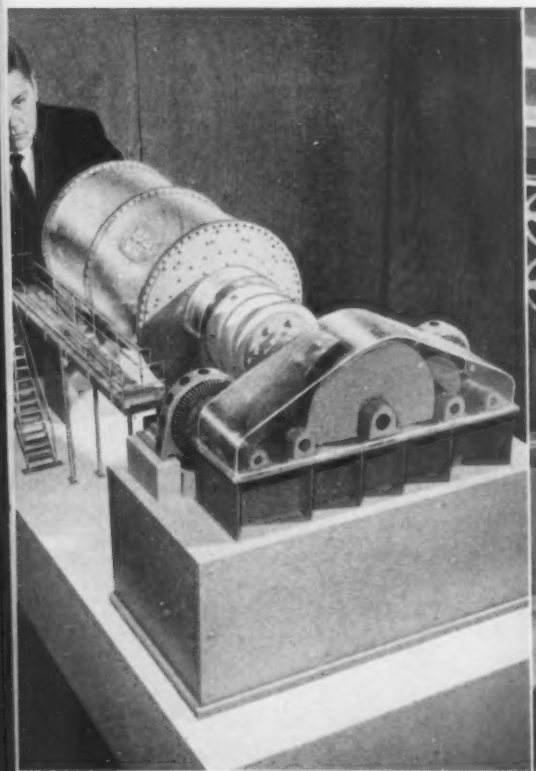
DEPENDABLE PRODUCTION WITH A NEW D7D

ideas and news:



Latest step in mill trunnion drive evolution: New Twinducer drive divides mill load electrically, between twin synchronous motors. Compared to trunnion drives with mechanically divided load, the Twinducer drive requires 50% less space. Since there are no floating gears or pinions, gear wear is kept to a minimum. Twinducer drive fits any plans for automatic grinding operation.

For quality control . . . lower processing costs: Systemation engineers help you benefit from the degree and type of automatic operation most suited to your needs. Allis-Chalmers will undertake responsibility for the design of complete operating facilities. Systemation service is based on a thorough understanding of your processing requirements, gained from years as a process designer and major equipment supplier to your industry. Added is the experience of over 500 successful advanced electronic control systems by Consolidated Systems Corporation, an affiliate company.

Which of these productive ideas could be working for you?

A pump that defies wear. A high-voltage motor control center. These examples demonstrate the extra value that is standard with Allis-Chalmers...the greater efficiency and the added productivity which are yours when you buy A-C products, systems and services. Call your Allis-Chalmers representative for details on A-C "worth-more" features. Or write Allis-Chalmers, Industrial Equipment Division, 905 S. 70th Street, Milwaukee 1, Wisconsin.

Systemation is an Allis-Chalmers servicemark. *Twinducer, Ripl-Flo, SpaceMaker, Pyro-Shield* and *Shelter-Clad* are Allis-Chalmers trademarks.

420,000 tons of sand pumped . . . no major repairs: This A-C rubber-lined pump, in service almost five years, pumps rod mill discharge to sand screws for classification. It replaced an alloy metal pump which failed after pumping 10,000 tons. The alloy pump replaced a standard metal pump which failed after 4,000 tons. Only $840 or about 2 mills per ton has been spent for repairs.

High output — low installation costs: One of the world's largest aggregate-handling screens met the needs of an aggregate producer for higher output and minimum installation costs. This 7 by 20-ft Ripl-Flo screen handles 600 tons per hour and is mounted on foundations previously used for a 5-ft screen.

So low, two fit where one used to go: This new SpaceMaker control center is the first completely new 2- to 5-kv motor controller development in more than a decade. Two-high design can cut floor space needs in half. Full drawout construction makes it the safest, most easily accessible controller available. Flame-retardent, track-resistant Super Pyro-Shield insulation adds reliability. Walk-in Shelter-Clad enclosures available for outdoors.

A-C INDUSTRIAL EQUIPMENT DIVISION: motors, generators, controls, rectifiers, pumps, compressors, crushers, mills, screens, kilns, coolers, industrial systems.

OTHER A-C PRODUCTS: thermal, hydro and atomic electrical generating equipment; switchgear, transformers, unit substations; tractors, earth-moving equipment, engines, lift trucks. A-1402

ALLIS-CHALMERS

Enter 48 on card, page 169

New Perlite Processing-Expanding Plant In Idaho Off to Good Start

A successful $345,000 stock offering recently completed by Oneida Perlite Corporation of Malad City, Idaho, assured the Intermountain West and the nation a promising new industry.

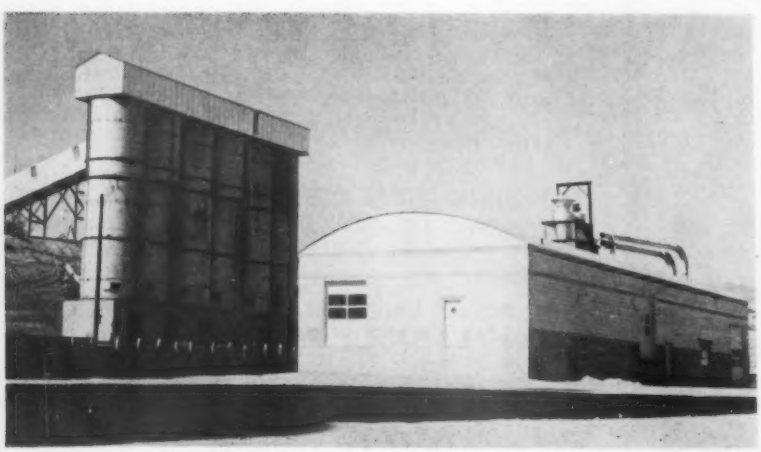
First shipments of perlite ore were made on November 1, 1960, and shipping is now at the rate of 5,000 tons per month (100 railroad cars per month).

Marion J. Hess, president of Oneida Perlite Corporation, has announced that the company will furnish raw perlite ore to the Intermountain region and also to more distant areas.

Oneida has the mineral rights for two complete ranges of mountains in Oneida County, Idaho. The deposits, 25 miles from Malad City, contain every type of perlite, most of which is 98 percent pure ore. The perlite is mined simply by removing a shallow layer of overburden, taking the ore from the open pits, and transporting it to Malad City for processing.

In addition to Mr. Hess, the officers elected are as follows: Udell Champneys, vice-president; Paul Mills, secretary-treasurer; and Loyal Lewis and Rosell Mills, both directors. All of the officers and directors are residents of Malad City.

A panoramic view of Oneida Perlite Corporation's perlite mine, located 25 miles from Malad City, Idaho.



A closeup of the $150,000 Oneida installation at Malad City, showing the silos and the expanding plant. The product turned out here is known as Perlcor.

Gypsum Production, Sales Dip In Third Quarter of 1960

In the third quarter of 1960 production of crude gypsum from domestic mines was 2,657,823 tons—13 percent below the output in the corresponding period of 1959, according to the U. S. Bureau of Mines. Imports during the 1960 third quarter dropped 11 percent. Production of calcined gypsum 2,280,562 tons, was 13 percent lower than in the third quarter of 1959.

Sales of most gypsum products declined during the quarter. Compared with the third quarter of 1959, gypsum for uncalcined uses dropped 7 percent, industrial plasters 18 percent, building plasters 14 percent, and board 12 percent. Total sales more nearly equalled those of the third quarter of 1958. Uncalcined gypsum products were 6 percent higher, building plasters 6 percent lower, board 4 percent higher, and industrial plasters about the same as in the correesponding period of 1958.

Approximately $6 million is being sought by Adamjee Industries, Ltd., Karachi, Pakistan, to finance the construction of a cement plant at Gharibwal, in the northern part of West Pakistan. The annual production capacity of the proposed plant is expected to be 450,000 long tons. The project has Government of Karachi approval.

A new 150 t.p.h. sand and gravel plant has been placed in operation by Consolidated Sand and Gravel Limited, Toronto, Canada. Located near Brome, Ont., the plant will produce coarse, fine, and medium sand, and will serve an area extending from Toronto to Oshawa.

"Our screening efficiency has jumped 25% with SECO Twin Bearing SCREENS"

says Bill Estell, Vice President, TOWANDA SAND & GRAVEL CO., INC., TOWANDA, PA.

"In the past year and a half, since putting SECO Twin Bearing SCREENS on the job, our production capacity has increased so much that we had to open up the feed to take the increased loads. And during this time, there has not been a single minute of downtime.

"As a matter of fact . . . we have been able to ADD to our production time because we don't have to shut down at lunch time any more for greasing bearings, thanks to the oil bath lubrication of the bearings in our SECO Twin Bearing SCREENS. Believe me, SECO is what I call the 'Cadillac of vibrating screens' ".

You'll certainly agree with Mr. Estell when you put SECO Twin Bearing SCREENS in your plant for less downtime, greater efficiency, top tonnages and greater profits!

Send TODAY for Twin Bearing Booklet TB-21

SCREEN EQUIPMENT CO., INC.
BUFFALO 25, N. Y.

Manufacturers of vibrating screens EXCLUSIVELY for over a quarter of a century.

SECO

"TIME CONSCIOUS" VIBRATING SCREENS

Enter 51 on card, page 169

How Union-Camp's 5-Star Multiwall Plan increased a pallet payload by 400 lbs...without increasing its size!

A leading supplier of high density resins* had been packing his product in 50-lb. sewn-bottom multiwalls. This gave him an efficient, 40-bag (2,000 lb.) pallet load.

When he added a *low density* resin to his line, however, he found his existing bag wouldn't accommodate 50 lbs. of the new resin due to its increased volume. A slightly larger, sewn-bottom multiwall was tried, but this reduced the pallet payload to 32 bags (1,600 lbs.). Net "loss": 400 lbs. Net result: more handling . . . more trips to the warehouse . . . higher cost.

Heightening the pallets to 10 tiers instead of 8, offered no solution—they wouldn't pass through the existing archways. To say nothing of the problem of loading trucks and trailer cars.

New bag does the trick

At this point, the 5-Star Packaging Efficiency Plan went to work. Union-Camp multiwall specialists experimented with several different bag sizes and styles. Their solution—a multiwall with a *pasted* bottom and side gussets, a *rectangular*-shaped base—and 20 per cent more capacity!

With the new design, 50 lbs. of the low density resin can now be packed in each bag. Most importantly, the pasted bottom bags can be palletized five to a tier, eight tiers to a skid for a total payload of 2,000 lbs.—the same as the high density resins.

Warehouse space saved

The pasted-bottom bag offered several outstanding advantages. It permitted better use of warehouse space. It increased the yield per warehouseman to *1,000,000 lbs. a month.* And it initiated the development of a similar design for the company's high density resins, which could increase the present pallet payload to 2,500 lbs.

Space-saving secret is in bottom of bag. New design (left) with rectangular-shaped base has 20 per cent more capacity than sewn-bottom bag (right).

Works for you five ways

Apart from bag construction and materials handling, Union-Camp's 5-Star Plan covers bag design, packaging machinery and specifications control. An improvement in any one of these areas conceivably could result in substantial savings for you. In any case, it costs nothing to find out. See your local Union-Camp man for complete details.

2,000 pallet load of new, low density resin bags fits easily through existing doors.

FREE 16-PAGE BOOKLET

Write Dept. M-3 today for a free copy of Union-Camp's new 5-Star Plan booklet. It describes many case histories showing how packers like yourself have achieved greater efficiency and economy in their multiwall operation.

UNION-CAMP*
MULTIWALL BAGS
Union Bag-Camp Paper Corporation 233 Broadway N.Y. 7, N.Y.

* NAME ON REQUEST

You won't find any squares in the Coates Triple-Forged Carbex Grinding Ball gang. They are all perfectly round to give you better, longer lasting milling surfaces. Coates patented a process for the first round Grinding Ball back in 1918 and has kept a high standard of roundness ever since.

Coates Carbex Grinding Balls are carefully made with great skill and care from special high-carbon steel. Triple-forged into perfect spheres, heat treated for hardness, yet toughened to the core to withstand milling strains.

Today's Coates Carbex Grinding Balls have proven by actual production run tests to be your best buy. Yet, Coates sponsors continuing research to find ways of making even better grinding balls.

Call for Coates Triple-Forged Grinding Balls . . . built with care for longer wear.

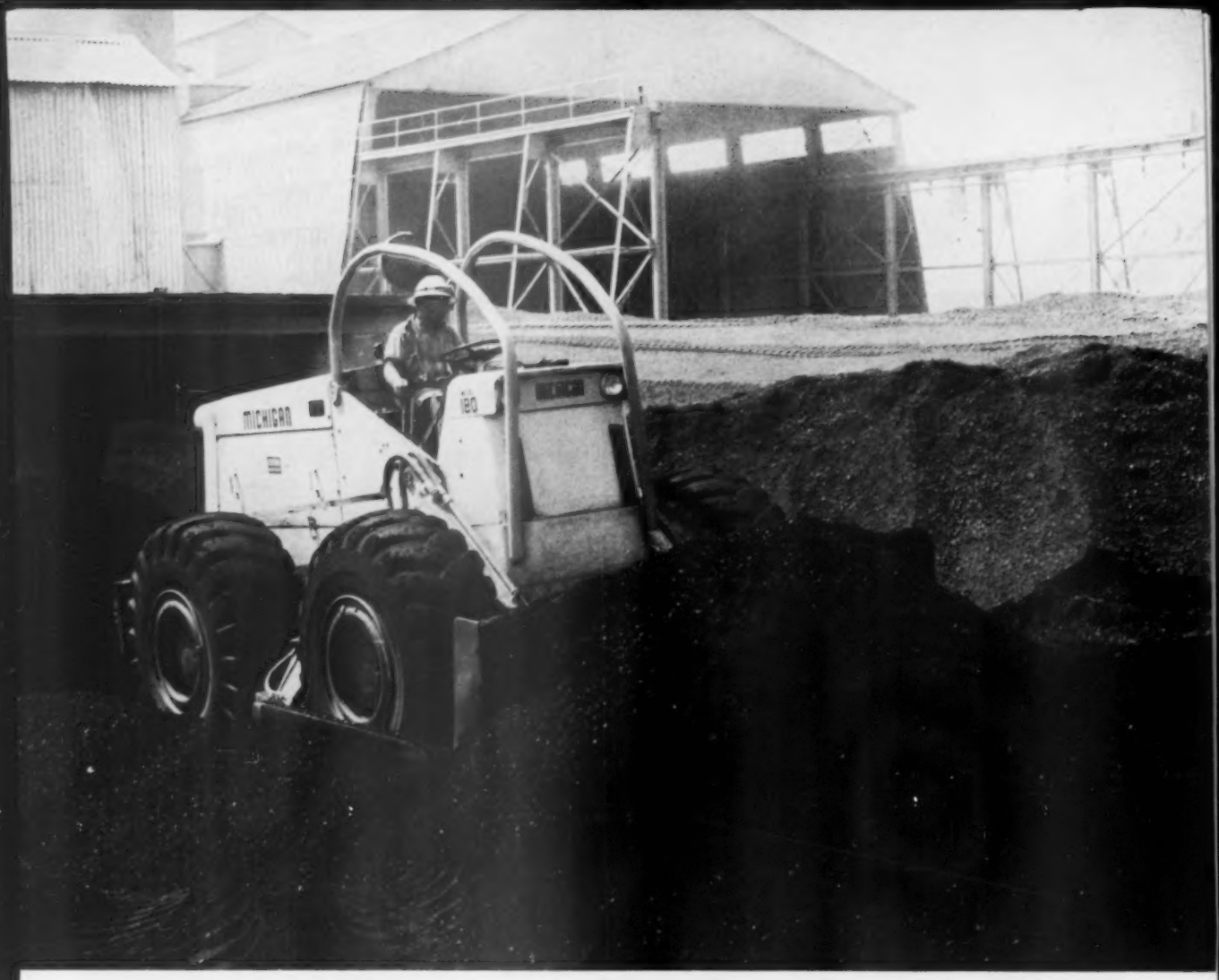
Write for prices . . . All sizes — ½" to 5" carried in stock for immediate shipment.

COATES

STEEL PRODUCTS COMPANY

GREENVILLE, ILLINOIS

LARGEST EXCLUSIVE MANUFACTURER OF GRINDING MEDIA



VERSATILE TOOL ON SIX

Mobile Michigan releases crawler, yard locomotive for other services at Universal Atlas Cement plant

A rubber-tired 162 hp Tractor Dozer, originally used at this plant to maintain a coal stockpile, has become a versatile production tool on half a dozen typical important dozing tasks.

Owner and operator of the machine, a Michigan Model 180, is the Fairborn, Ohio, plant of the Universal Atlas Cement division of U.S. Steel, New York, N.Y.

In a typical year, their unit dozes coal, clay, limestone, gypsum and cement clinker at an average rate of more than 300,000 tons. It also moves an average of 1,000 coal gondolas a year, each loaded car weighing 55 to 70 tons. And on many days it travels 15 miles under its own power to help clean up around shovels in the limestone quarry.

Dozes coal at speeds to 10 mph

One of the Michigan's most important operating traits, according to Universal Atlas plant executives, is its ability to thoroughly mix and remix coal on the stockpile. This is important because coal received from various mines differs in BTU content and must be blended for most efficient burning. They attribute the successful blending to two Michigan advantages. One, the Model 180 *dozes at speeds up to 10 miles per hour*. Two, its blade design *rolls* the coal as the Dozer moves forward.

Enter 54 on card, page 169

Spontaneous combustion eliminated

Equally important, production men say, is the Michigan's compacting ability on both the coal and clay stockpiles. They haven't had a coal stockpile fire since the 33,750 lb Tractor Dozer was placed in operation, and erosion by both wind and water on the clay stockpile has been effectively reduced.

Tows up to 5 railcars at once

Another task successfully assigned to the Michigan is "muling" coal cars from rail siding to coal shaker dump adjacent to the stockpile. By handling up to five loaded gondolas at a time, it has released a yard locomotive for other plant operations. After each dump, the rig spreads, mixes and compacts the coal in the stockpile, which varies in size up to 400 ft long, 200 ft wide, and 20 ft high. Feeding coal handling equipment for the kilns is also a regular Michigan task. Its production rate here averages 21,000 tons a month.

Stockpiles, compacts clay too

Whenever these coal handling chores permit, the Tractor Dozer is dispatched to work on other stockpiling, or to the quarry. First priority in this type of activity goes to building up clay stock, a task performed entirely by the Michigan. In this operation, the clay, stocked at the rate of 3,500 tons a month, is dozed into place without interruption in any other production area.

Equipped with coupler, Michigan "mules" both loaded and empty rail cars. Loaded cars weigh up to 70 tons each.

Michigan's big tires compact clay so effectively wind and water erosion have been substantially reduced.

Cleans shot rock

A variety of other dozing jobs are done by the machine as well. For example, it cleans up around rock shovels in the quarry. It stockpiles crushed rock. And it works in winter cleaning and shaping the highly-abrasive cement clinker storage pile.

We'll demonstrate for you

We'd welcome the opportunity to show *you* how a Michigan Tractor Dozer's versatility, power, speed—and dependability—can increase production on your job. There are four sizes to choose from: 162, 262, 380 and 600 hp. Call us, at your convenience, for a "no-obligation" demonstration *on your job.*

Michigan is a registered trademark of
CLARK EQUIPMENT COMPANY
Construction Machinery Division

CLARK® EQUIPMENT

2479 Pipestone Road
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In Canada:
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COMMON PRODUCTION JOBS

At quarry, Michigan cleans around rock shovels. Unit reaches job, 15 miles from plant, by driving over truck haul roads at speeds up to 20 mph.

new machinery

● Two new portable primary crushing plants have been announced by Iowa Manufacturing Company. They are the 4336 and 3026 single impeller impact breakers with vibrating grizzly feeders. The manufacturer reports their simple design and fewer working parts mean less wear and maintenance, and that these units are highly portable with a minimum of disassembly necessary to meet road weight limits.

The 4336 has a capacity of 200 to 400 t.p.h.; and the 3026 is rated at 150 to 250 t.p.h.

Capacities of these units depend on material characteristics and size of product.

Iowa Manufacturing indicates the breakers are ideally suited for use in material with a low silica content, and produce a high volume of cubical aggregate with a low percentage of fines and a minimum of slabs, slivers, and soft stone. The company further states that plugging or clogging with soft, sticky material is also held to a minimum.

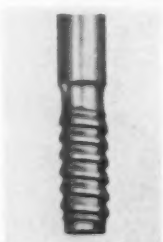
Material is first reduced by striking whirling impellers and then hurled against a breaker plate and breaker bar for secondary reduction. A large unobstructed discharge opening allows free flow of material to the delivery conveyor.

The heavy rotor and impellers also act as a flywheel to give continuous, smooth operation unaffected by surges of material. The rotor shaft turns on heavy-duty, anti-friction spherical self-aligning bearings.

A vibrating grizzly-type pan feeder is used to feed material to the breaker. It has an integral tapered-bar grizzly which bypasses fines and undersize material. Thus only material requiring primary reduction goes into the breaking chamber.

The underslung vibrating unit, protected against falling rock, is engineered to provide a uniform feed rate. **(350)**

● HL-16 and HL-17 threads are now available on the complete line of Brunner & Lay long hole drilling accessories—carbide Rok-Bits, extension steel, couplings and striking bars. Brunner & Lay states that the wide HL threads assure maximum wear, tight connections, great rod rigidity, plus easy hand uncoupling. **(351)**



● "Powertrack," new self supporting flexible carrier, conveys electric power, oil, air, water, and gases to equipment in motion. Great flexibility is possible as all cables and hoses can be conveyed at once, guarding against crimping, breaking, straining, or scuffing. Powertrack is a completely enclosed system designed for safety and reliability.

The new carrier can be used in either horizontal or vertical planes. The manufacturer reports it has an unsupported travel range of 40 ft. at speeds up to 160 ft. per. min., and that variations in design permit long travel lengths and high travel speeds. Standard cables are used in the Powertrack. **(352)**

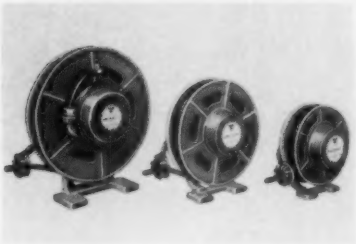
● The new 40-L all forged one-piece point for shovels of 8- to 9-cu. yd. capacity is now being produced by the H & L Tooth Company. The manufacturer states the 40-L point is mechanically forged-to-shape from high nickel alloy steel, has an extreme resistance to severe abrasion, and can absorb excessive high impact, even in extremely cold climates.

By forging, the H & L 40-L point is uniform hardened from core depth throughout the nickel alloy steel, then tempered through a heat treating process that is electronically controlled in hydrogen-atmosphere furnaces.

The 40-L has the H & L Flexpin type connection that secures the point to the adapter. **(353)**

and equipment

for further information use card on page 169



● Several series of standard and modified standard reels to pay out and take up electrical cable in lengths from 15 ft. to over one mile of cable are provided in Aero-Motive Mfg. Co's. enlarged POW-R-MATIC Reel line. Available in from one through 90 conductor capacity, the reels are designed for use on cranes, hoists, conveyors, trucks, portable electric equipment, and other applications where dependable retractable action is required to neatly store and protect cable from abuse.

Reels are made of modern alloy metals to combine maximum strength and safety with minimum weight. POW-R-MATICS are dust and moisture tight and are also available in explosionproof construction. **(354)**

● The E. D. Bullard Company has introduced its "Bull/Horn," a construction equipment reverse alarm that meets recently released specifications of the U. S. Army Corps of Engineers. It can be used on graders, tractors, scrapers, wheel loaders, track loaders, batch trucks, haulers and carry-alls.

The manufacturer reports that among the features of the Bull/Horn are its mechanical alarm enabling it to be in use at any time, whether or not the motor is running, and the fact that the unit requires no maintenance.

Bull/Horn is easy to operate and relatively simple to install. Its distinctive warning signal is directional. All moving parts are precision made and lubricated for life. **(355)**

● Cummins Engine Company has introduced a new lubricating oil filter element for 750 and 500-cu. in. by-pass type filters. This element features construction for strength and rigidity, high quality media for a uniform, efficient filtration, and extra-large perforations for uniform oil flow.

The manufacturer reports the Cummins element has been put on the market after being fully tested in automotive and industrial applications, and that because it contains no additive removing chemicals it is ideally suited for compound oils. **(356)**

● The Frank G. Hough Co. is offering the first model of their new "Paydozer" line, the D-120. This unit is powered by a 300-hp. turbocharged diesel engine and weighs 55,000 lb. The 3-way blade action includes lifting and lowering, forward and backward pitch as well as side tilt.

Unique features of the new D-120 dozer is its convertibility into a front-end loader whenever working conditions dictate. The optional package which permits the conversion includes boom arms, hydraulic lines, bucket and linkage together with one element of the torque-converter for loader operation.

Other features of the basic D-120 unit include full power shift transmission, built by Hough, which requires no stopping for range shifts. It is a full reversing, constant-mesh type transmission with four speed ranges (up to 26 m.p.h.) in both forward and reverse.

The matching torque-converter is a single-stage, single-phase unit delivering maximum torque for top traction for dozing and push loading operation.

Power-transfer differentials on both axles provide top traction for the Paydozer unit. The manufacturer reports that when one wheel is capable of more tractive effort than the other on the same axle, it can automatically receive 38 percent more torque.

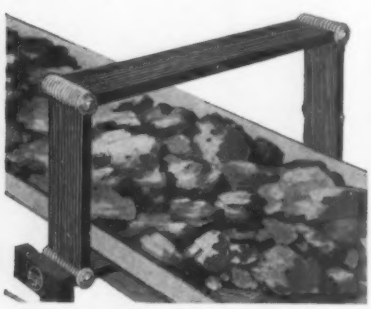
The D-120 blade is 12 ft. 4 in. wide at the cutting edge and 4 ft. 8 in. high. Clearance under the cutting edge, at full lift height, is 3 ft. 2 in. The digging depth below ground level is 1 ft. 6 in.

The total forward and backward pitch is 35 deg. and the side tilt angle is 10-deg. per side or a total of 20 deg. **(357)**

Keep tramp metal from damaging costly hammermills ...with the RCA ELECTRONIC METAL DETECTOR

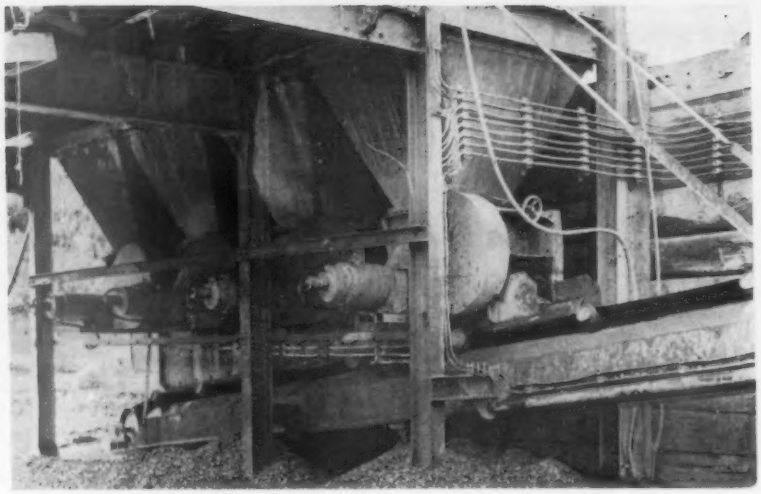
Manganese steel dipper teeth, drill bits, castings and broken machine parts that might cause damage to secondary crushers, and other critical equipment, are automatically discovered by the RCA Electronic Metal Detector. Designed for heavy-duty service, to withstand dust and moisture.

Easily installed on existing conveyors, this electronic detector is always on the job, probing out all kinds of tramp metal, both magnetic and non-magnetic which can cause downtime and repairs. Prevent tramp metal losses at once! Write to RCA, Dept. R-236, Building 15-1, Camden, N. J.



RCA The Most Trusted Name in Electronics
RADIO CORPORATION OF AMERICA

Enter 58 on card, page 169



● Variable speed motors with remote speed control dials have been introduced into the "Blender" volumetric feeder system made by Frederick Parker Limited, of England, and used for blending aggregates.

Blenders which employ the natural fall of material through an adjustable gate with flow controlled by rotating paddles, are used to supply continuous feed or intermittent batches of material. They supply proportions to any specification with an average accuracy of 2 percent, according to the manufacturer.

They are mounted singly or in banks, beneath or on the side of aggregate storage bins. Combinations of speed and door settings provide a range of outputs from 5 to 200 t.p.h. from one Blender.

Parker Ltd. notes that until this development there were two basic blending systems—a graded feed system with fixed speed drive and time control; and a system with handchange 4-speed drive and time control.

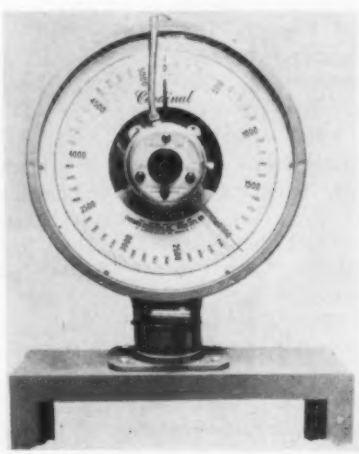
The full range, variable speed drive with remote control is a development of the speed change feature. It eliminates the need for resetting doors for specification changes and gives fingertip control from a remote control panel.

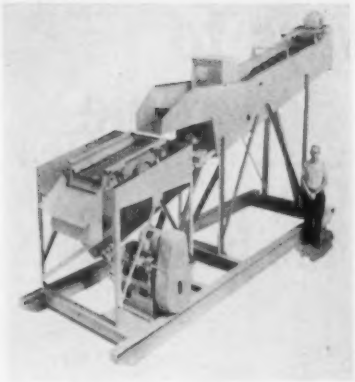
When installed, all Blender doors are set so that a similar tonnage passes from each in a given period and are not disturbed after this. To work the system, the operator turns a pre-setting dial to the percentage required from each feeder.

Specification changes are made by changing percentage readings on the pre-set dials. Batch volumes are altered by increasing or reducing delivery time. **(358)**

● The Cardinal Scale Manufacturing Company has introduced a new Microset 606 weight cut-off control for all dial type scales. Company representatives said the new Microset cutoff can be field installed quickly and inexpensively on almost all dial types of scales requiring no modification of the scale itself.

The new control can be operated by one man with a simple dial setting and the pressing of a button. The Microset 606 can be equipped with a single stage cut-off, or 2-stage cut-off. Designed for versatility, optional circuit arrangements can be provided to fit most needs. **(359)**





● Completion of a highly successful first year of field operation of the new Slurry Refuse Separator is reported by Eagle Iron Works. Designed to furnish low cost separation of such undesirable materials as coal, lignite, and trash particles from sand and gravel feed, the unit is actually a composite of four separate components. These are: coarse material washer with trash remover tub end, a small single deck screen, a sump, and a slurry pump. Operating principles involved include a separating medium with higher sp. gr. than water, viscosity effect of the medium, rising current separation factor, and jigging action of paddles in the lower pool area of the washer. The principles are individually used in existing processing equipment, but this is described as the first application of all four in one unit. In its field application, the Slurry Refuse Separator handled a feed ranging from 1¾ in. to 4-mesh, and was reported to be 99 percent efficient in removing an undesirable coal fraction. **(360)**

● A new component for their line of Accoloy Kuplex sling chain assemblies has been introduced by American Chain Division, American Chain & Cable Company, Inc. This component is designated as the Accoloy Kuplex Safety Hook with Safety Latch Assembly.

The manufacturer reports that present users of Kuplex slings with sling hooks can convert such hooks to a safety type hook by replacing the conventional load pin with the special safety latch assembly available as a separate component. Kuplex sling chains are now furnished with an improved type load pin with a retaining disc. **(361)**

Enter 59 on card, page 169

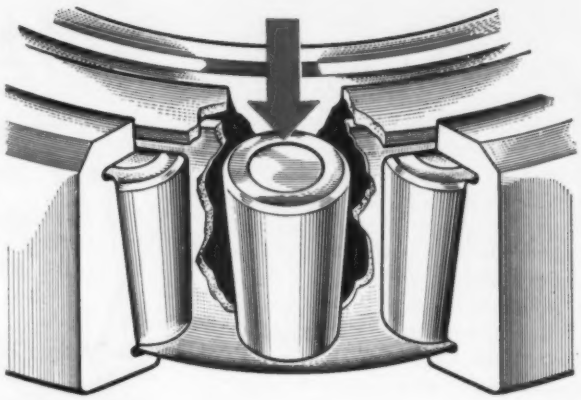
LUBE LOGIC

Three ways to chop downtime

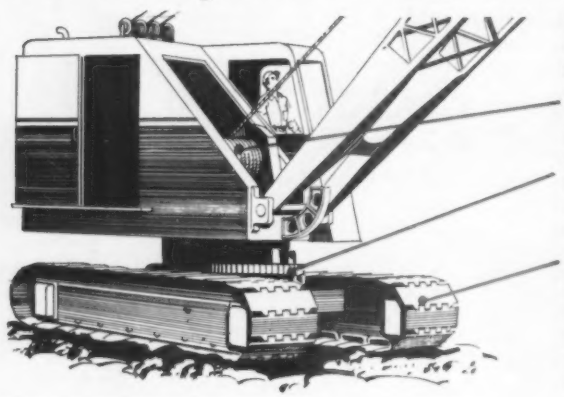
Change the differential lube, save the bearings

It's vitally important, on new trucks, to change the differential lubricant promptly at the mileage recommended by the manufacturer. By that time, the factory-installed lubricant may be highly abrasive, because it picks up minute particles of metal worn off the gears during break-in. If you don't change the lubricant you'll get very rapid wear of differential gears and bearings.

One of the most likely spots for this wear to show up is on the raised shoulder at the ends of antifriction bearing rollers. You'll know it's worn if, upon inspection, you find that the recessed area in the center of the roller ends has disappeared. If roll-end wear persists long enough without correction, pinion and ring gears get noisy. When it comes to that, your only option is to replace the bearing. Moral: whatever you do, don't stretch lube intervals, especially on new vehicles.



Some important don'ts on power shovel lubrication



It's an old Texaco maxim that over-lubrication is sometimes worse than none at all, and there are three vital spots on power shovels where this is particularly true:

1. **WIRE ROPE** that winds onto drums fitted with clutches should be lubricated very sparingly. Otherwise the lubricant may get onto the clutch faces and cause slipping.
2. **TURNTABLE ROLLER PATH** should never be lubricated, unless it's the double-flange type with hook rollers. Lubricant will cause the rollers to slide and wear flat. Lubricate the bearings of turntable rollers sparingly to avoid drip on the turntable path.
3. **TREADS** should never be lubricated. (We're talking about the tread only now; the track rollers or idling assemblers usually need frequent lubrication to keep them free of grit.) The links that connect the individual treads are designed to operate without lubrication. Any oil or grease on these pins will pick up abrasive dirt, which would act as a lapping compound on the pins, and drastically shorten service life.

No-sweat way to adjust crawler treads

Crawler treads are easier to adjust if you dab a little Texaco Threadtex on the adjusting screws. The Threadtex stays put through months of tough service, keeps the screws free-turning and corrosion-proof.

TEXACO LUBRICATION ENGINEERS

If LUBE LOGIC doesn't solve your problems, call your local Texaco man. Anytime, all the time, he's your best source of money-saving lubrication ideas. Don't forget that "lubrication is a major factor in cost control."
Texaco Inc., 135 East 42nd Street, New York 17, N. Y.

TUNE IN: TEXACO HUNTLEY-BRINKLEY REPORT, MON. THROUGH FRI.—NBC-TV

TEXACO

Throughout the United States
Canada • Latin America • West Africa

● Two new wheel tractor-scrapers, featuring a torque divider power shift transmission, have been announced by Caterpillar Tractor Company. The new machines are the 4-wheel 630 Series A and the 2-wheel 631 Series A.

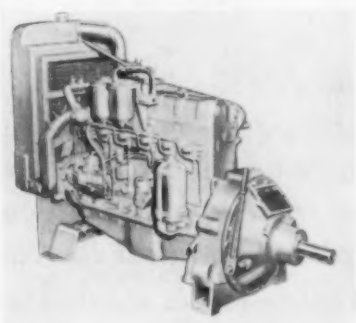
Both tractors are powered by a completely new design, 4-valve-in-head, diesel engine that has a maximum rating of 420 hp. and a flywheel rating of 335 hp. The 630A has a top speed of 41 m.p.h. The unit pictured, the 631A, has a top speed of 31 m.p.h. Other machine features include 28 ply 29.5 by 35 tires, "live" air actuated cable controls that reduce operator effort, advanced design steering systems for both units, and a high degree of service accessibility.

Scrapers are of Lowbowl design and have a struck capacity of 21 cu. yds., and a heaped capacity of 28 cu. yds. Refinements to the basic Lowbowl concept permit corner voids to be filled without staying excessively long in the cut.

For extra-large production capabilities under special job conditions, a new unit, the 630A-482C Tractor-Scraper combination, will be available. The new 482 Series C has a 35 cu. yd. heaped capacity and 28 cu. yd. struck. These units are designed specifically for easy loading material and long hauls without adverse grades.

A primary consideration in the design of the new tractor-scrapers was the matched development of the torque divider power shift transmission with the new D343 diesel engine.

To "shift," the operator need only move the selector lever to one of three speed range positions. Within each range, the most appropriate of three "drives" is automatically selected to meet changing power requirements. The transmission combines planetary gear groups with a torque converter. (362)

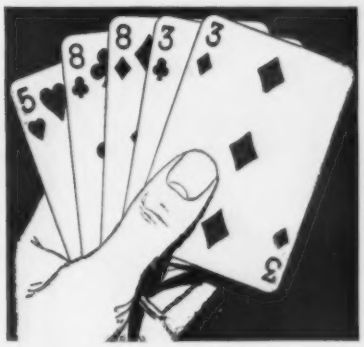


● Allis-Chalmers is now making available as a commercial engine its D-262 diesel engine which has been time tested as the regular supply of power for its Model DD Motor Grader and other industrial and farm units.

The basic D-262 diesel develops 77 hp. at 2,200 r.p.m. The engine has a 3 9/16-in. by 4 ⅜-in. bore and stroke and a 262-cu. in. piston displacement. For long engine life, it features replaceable wet type cylinder sleeves, full pressure lubrication, and efficient air and oil filtering systems. It has a 12-volt electric starting system.

Available are accessories that adapt the engine to a wide range of applications. The open power unit consists of the engine assembly, radiator and engine support, exhaust pipe and clutch power take-off, with the closed power unit also including sheet metal hood and rear panel housing. (363)

POKER? Play to win!



How would you play this hand?

You'll be the high hand before the draw about 3 times out of 5, but the odds are roughly 12 to 1 against helping on the draw. Odds are better than even somebody will beat you. Don't open. Don't call. Tough? Yes, but be patient...and win.

Here's a sure winner from FORD:

Ford pays half your fuel bills for a full six months (or 400 tractor hours) on the purchase of any new Ford or Fordson diesel tractor.

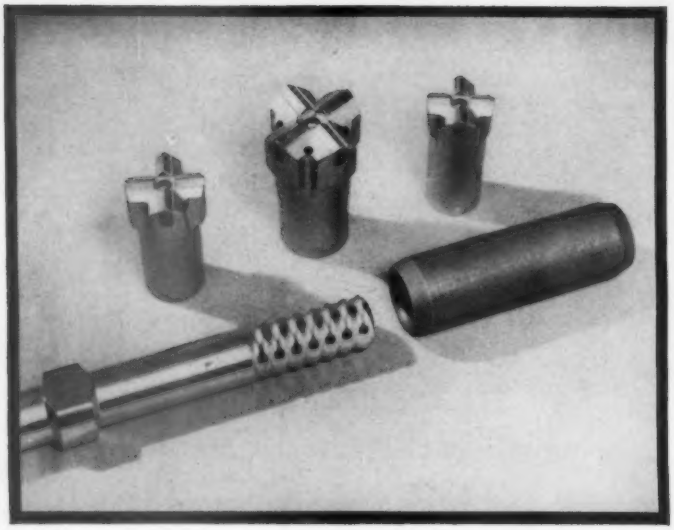
This offer, made possible by the amazing fuel-saving performance of these low-priced diesel tractors, expires March 31, 1961.

No "hidden" price increase... no tricks of any kind. See your Ford Tractor Dealer for all the money-saving details!

Tractor and Implement Division, Ford Motor Company, Birmingham, Michigan

Ford TRACTORS EQUIPMENT

Enter 61 on card, page 169



Here's proof Coromant rope-thread bits and steels SAVE TIME AND MONEY

"Up to double the footage between sharpenings!"
"Premature rod breakage is almost non-existent!"
"40% more usable life—more resharpenings!"
"Bit and rod life are well above average!"
"Uncouple by hand all the time!"
*"More rigid—drills straighter holes!"**

**Names of men quoted available on request*

The comments above are actual quotes from project managers, job superintendents, and drill superintendents who have tested new Coromant rope-thread bits and steels. They've learned, on-the-job, the benefits they—and you—can expect!

For example: The new rope-thread (only two turns per inch) holds tight in use, yet permits hand uncoupling. Reports show that the time saved results in more footage drilled per shift. Bit footage is well above average too, with less loss of carbide inserts. Prime quality ore plus nickel-chrome alloy permits cold-rolling from billets for greater strength, life and rigidity. And only with Coromant rope-thread steels can you re-thread without heat treating, too. Do it yourself, or at any nearby machine shop.

Want to know more? There's no obligation on your part, but we'll be glad to help where we can. Just call your nearest Atlas Copco Office, or write to us at Dept. PQ-7.

Atlas Copco

610 Industrial Avenue
Paramus, New Jersey
COlfax 1-6800

930 Brittan Avenue
San Carlos, California
LYtell 1-0375

Enter 63 on card, page 169 →

"Our new 944 Traxcavator loads and levels nine 18-yd. trucks an hour

It gets its bucket full easier than other machines, is faster and handles better. Has plenty of reach for big trucks, too."

THAT's the word on the 944 from Craig Childers, Western's Plant Superintendent. And here's what the operator thinks about it, "I like the way it handles. It's really a fast-loading machine; and it has good balance and visibility. The idea of having the lift arms out front where you don't sit between them is great."

You can choose from three sizes in the new Traxcavator line. The 944 packs 105 HP and a 2 cu. yd. standard bucket—the big 966 at 140 HP carries a 2¾ cu. yd. standard bucket—and the 80 HP 922 has a 1¼ yd. bucket. All three mount a variety of buckets and attachments for handling various materials. And all three have what it takes to move more tons per hour and stay on the job month after month with far less maintenance.

Your Caterpillar Dealer has all the facts. Ask him to set up a Traxcavator demonstration on your job, and get a firsthand look at all the new ideas that are built into these machines. It'll be a real eye-opener.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar, Cat and Traxcavator are Registered Trademarks of Caterpillar Tractor Co.

TRAXCAVATORS ARE MAKING OTHER LOADERS OBSOLETE

Here's how the 922, 944 and 966 are built to do a better job for you.

CAT DIESEL ENGINES—Turbocharged for efficiency and quick acceleration. Optional gasoline engines for the 922 and 944.

CAT POWER SHIFT TRANSMISSION—gives instant shifting, forward and reverse, 1st and 2nd speeds. High and low range selector also provides two-wheel drive for roading, four-wheel drive for power and traction in work cycles.

OPERATOR SAFETY—Lift arms and cylinders are forward of the operator and cockpit. Visibility is excellent and access is easy... up three wide steps.

LONG REACH—With the lift arms up front, the reach at dumping height of the new Traxcavators is impressive: 57" on the 966, 51" on the 944 and 41" on the 922.

OPERATOR CONVENIENCES—Bucket controls have automatic positioners to speed every cycle; machine controls are all power boosted for easy operation. Dual brakes give operator choice of braking with or without transmission engaged.

FULL LINE OF ATTACHMENTS—Special material buckets, side dump buckets, forks, cabs, etc.

Performing a TOP JOB...
The MIKRO-PULSAIRE
DUST COLLECTOR

Installed at the Hawaiian Cement Company's new plant at Barber's Point, Oahu, you'll find a total of nineteen MIKRO-PULSAIRE Dust Collectors, four of which are pictured above.

Because it has no moving parts . . . internally or in the gas stream . . . the MIKRO-PULSAIRE has proved ideally suited to handling highly abrasive materials such as cement. Other features to be considered are its record of 99.9% *plus* recovery, and high air-to-cloth filter ratio. Our Hawaiian installation provides a total filtering capacity of 329,928 cfm. Whatever your requirements, the MIKRO-PULSAIRE can deliver a top job for you, economically and with maximum dependability.

MIKRO-Products
PULVERIZING MACHINERY COMPANY
3 Chatham Rd., Summit, N. J.
A Division of American-Marietta Company

REPRESENTED THROUGHOUT THE WORLD IN SALES, SERVICE AND MANUFACTURING FACILITIES.

Enter 64 on card, page 169

● Canadian Halco Industrial & Mining Company, Limited, of Canada, is offering the new self-propelled "Halcotrack" drilling rig. Canadian Halco is a subsidiary of Halifax Tool Company, Limited, of England.

The manufacturer reports the down-the-hole drilling of the Halcotrack produces a clean, straight hole without loss of efficiency and with low consumption of compressed air. With the patented Halco-Stenuick hammers exhaust air from the hammer cleans the hole of cuttings.

Counterbalancing offsets the weight of the drill pipe as it is added and maintains a constant hammer/bit weight relationship, thus ensuing no deviation in hole direction, less bit wear, and lower machine maintenance.

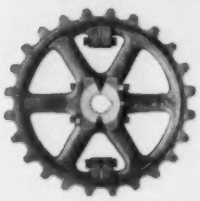
Other features of the Halcotrack as listed by the manufacturer are as follows: Interconnecting tubes carry hammer and supply it with air and rotation. As the tubes do not transmit any impact forces they are of small wall thickness making them light and easy to handle. Their large outside diameter helps to maintain the high velocity of the scavenging air.

Independent rotation is accomplished by high torque piston-type air motor variable in speed to suit changes in strata and advantageous for broken and other difficult ground conditions. A similar, separate, motor lifts the drill string from the hole. (364)

one call... that's all...

FOR CHAIN

FOR SPROCKETS



FOR BUCKETS

Try this: next time you need cast or steel chain, sprockets or buckets for your elevators and conveyors, call your nearby Rex Distributor. Then see what happens. You'll get fast delivery—or even faster if you're up against an emergency. Reason is that your Rex Distributor is fully stocked with a complete Rex line of equipment for the rock products industry. And his stock is backed by strategically located CHAIN Belt warehouses.

What more could you ask? Quality? Well, the name is REX—and better quality you can't find anywhere. You'd agree if you could see how Rex Steel and Cast Chains, Buckets and Sprockets are made—and if you could see how they last and last.

For over 70 years people in the rock products industry have been calling REX. Why not you, too? CHAIN Belt Company, 4604 W. Greenfield Ave., Milwaukee 1, Wis. In Canada: Rex Chainbelt (Canada) Ltd., Toronto and Montreal.

REX®

CHAIN BELT COMPANY

REX IS BEST...IN THE USER TEST

• Standardized, sectional belt conveyors for rapid, continuous handling of sand and aggregates designed to give benefits of a job engineered conveyor system are produced by Chain Belt Company.

The manufacturer reports the flexibility of Rex sectionalized conveyors precludes the necessity of piece-by-piece assembly. Each unit is structurally matched to provide dependable service from every section, with such components as chains, rollers, idlers, shafts, sprockets, and drivers assured through Rex manufacture.

Head and foot sections are aligned and factory-adjusted, ready for bolting to intermediate sections. Intermediate sections are available in either 24 or 42-in. truss depths. Truss lengths come in 6, 9, and 21-ft. sections that are 24-in. deep; and in 16, 20, and 24-ft. lengths that are 42-in. deep. Using these matched sections, conveyor systems of virtually any length can be constructed. (365)

• Chicago Pneumatic Tool Company has developed the CP-71 Sludge Pump, a lightweight scavenger designed to handle liquid containing up to 15 percent solids. The manufacturer reports the new unit is 17 lb. lighter than its predecessor, yet is capable of twice as much lift, and can eject 40 g.p.m. at 200-ft. head—100 g.p.m. at 50-ft. head.

Operating on the ejector principle, the CP-71 handles rock drill cuttings, sand, or other solids without causing rapid wear of internal parts. Trouble-free operation is stated as an important feature.

Air passing through the venturi sucks liquid into the pump. When the pump is full, air pressure forces the liquid out. The cycle is repeated automatically. Designed to be used with or without a suction hose, the CP-71 operates on an 85-c.f.m. compressor. It requires no priming. (366)

• The Ohmart Corporation has developed a nuclear density gauge for measuring mass flow of granular materials. Ohmart reports the first gauge of this type, recently installed in a cement plant, opens the application of radioactive sources as a control for materials in granular form moving through a production process. This includes cement and other materials whose specific gravity can be determined.

The manufacturer reports the key to the instrument's high degree of accuracy and stability is Ohmart's unique conversion cell. This radiation detector, which can be considered as a type of atomic battery, takes radiation emitted from radioactive sourses such as cesium 137 and cobalt 60 and converts it directly to electrical current. This is amplified to operate recorders and meters for either automatic or operator control of the manufacturing process.

Ohmart indicated that while gamma sources are used in most density and level gauges, a beta radiation source, strontium 90, is used in this first dry solids flow gauge.

The operation of this new gauge is based upon the Bremstrahlung effect, where a beta ray hitting solid material causes X-rays of various energies to be emitted. These pass through the material to the conversion cell on the opposite side. The amount of X radiation reaching the cell is determined by the amount of material passing a given point at any instant.

The new gauge can be installed with either a point or strip source. In the former, there is a single point where measurement is done. In the latter, source strips can be mounted one on top of the other for measurement over a distance.

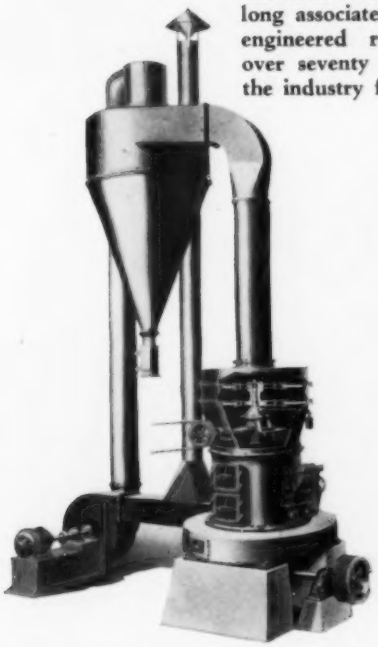
In the first installation, dry process feed to a cement kiln will be measured on a mass flow basis as it falls through a gravity feed pipe into the kiln. The measurement will indicate how much material is reaching the kiln, with the object of maintaining predetermined feed rate. Ohmart indicates this will improve cement quality and production efficiency. (367)

Raymond
HIGH SIDE ROLLER MILLS

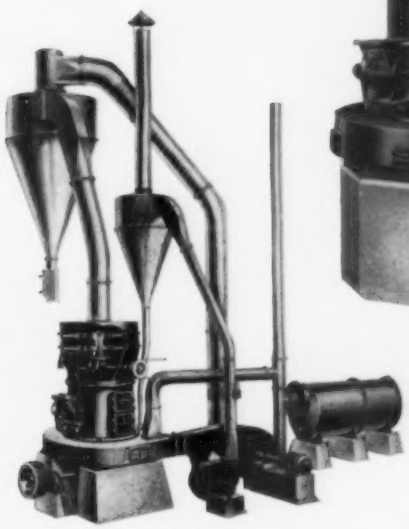
TODAY'S ECONOMY UNITS FOR FINE GRINDING OPERATIONS

ROLLER MILL ECONOMY is an accepted term long associated with the Raymond line of finely engineered roller mill equipment, developed over seventy years ago, and known throughout the industry for its traditional record of service.

SUPER ROLLER MILL for maximum economy in handling extra large capacities. Built in several sizes of five-roller and six-roller mills, capable of delivering from 15, 20 to 30 tons or more per hour.



STANDARD ROLLER MILL with Whizzer Air Separation. Provides instant fineness control over a wide range by one single adjustment, and maintains consistent uniformity of product.



ROLLER MILL equipped with Raymond Flash Drying system for simultaneously drying and grinding material containing small percentages of surface moisture. Important savings result through elimination of separate dryers and conveyors.

Raymond present-day designs incorporate many cost-saving features that culminate in time-proven efficiency for the production of uniform quality powdered materials.

(1) Pneumatic feed control maintains a maximum "load" on the mill and keeps it at full capacity during the entire run.

(2) Self-lubricating oil journals on the roll assemblies insure constant, automatic circulation of the oil, resulting in important economies in lubrication and maintenance.

(3) Large rugged bearings, heavy over-size shafts, finely balanced construction and grinding elements made with specially hardened wearing surfaces, all contribute to long service-life and low-cost performance.

PROTECT YOUR PROFITS with the MOST DEPENDABLE EQUIPMENT

For general information on Raymond Roller Mills refer to Catalog Number 79 Q.

For specific details on the Super Roller Mills write for Bulletin Number 72 Q.

COMBUSTION ENGINEERING, INC.

427 W. Randolph St.
Chicago 6, Illinois

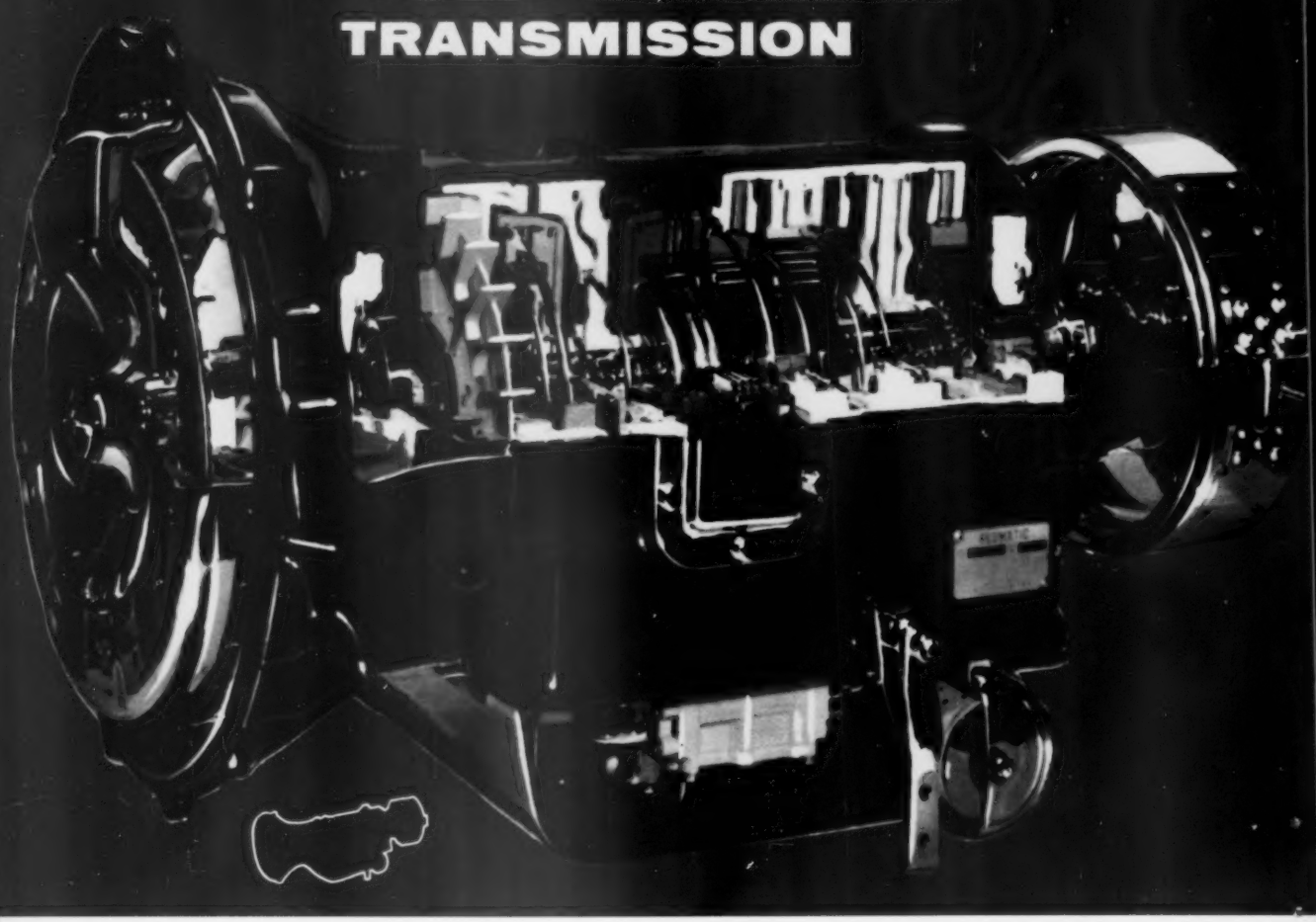
Raymond Division

Combustion Engineering-Superheater Ltd., Montreal, Canada

SALES OFFICES IN PRINCIPAL CITIES

REO

FULLY PROVED, FULLY AUTOMATIC TRANSMISSION



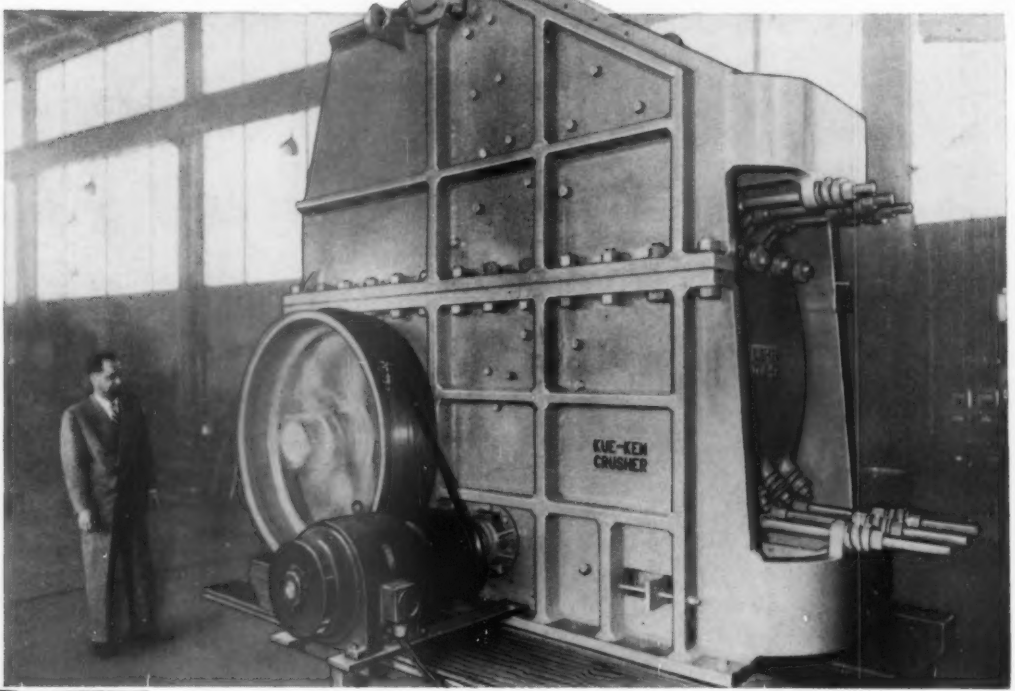
REO and REOMATIC A PROVEN CONCEPT . . . ReoMatic transmission eliminates the conventional clutch pedal and the guesswork of inexperienced drivers. Automatically, it selects the most efficient gear ratio in each drive range and shifts gears under full throttle in response to load demands upon the engine. There's no power interruption, no engine lugging, far less chance of shock load damage to drive lines. Result: operators of both over- and off-highway fleets report faster operating schedules, reduced maintenance and downtime costs, prolonged engine life. Make no mistake. ***The ReoMatic is not a beefed up automobile transmission.*** It's a rugged, heavy duty unit specifically engineered to team up with famous Gold Comet engines (130 to 235 h.p.) in the ***World's Toughest Trucks.*** So before you buy anything, get the full story on the Reo that's right for your job — equipped with ReoMatic fully automatic transmission.

MATIC

Gold Standard of Values

REO MOTOR TRUCK DIVISION, THE WHITE MOTOR CO. • LANSING 20, MICH.

KUE-KEN® patented flywheel release automatically "cuts out" costly downtime and repairs



Resetting overload requires only a wrench

Tramp iron that often breaks the frame or toggles of conventional crushers is no problem with Kue-Ken. Its flywheel automatically cuts out on tramp iron and runs free without ratcheting. Gone are lengthy downtime, costly repairs and expensive replacement parts, lost production time and idle labor! On release of the flywheel, an alarm will sound or the motor will stop automatically. On simple removal of the tramp iron, the Kue-Ken flywheel can be quickly reset and the crusher put back into immediate operation.

Kue-Ken uses far less power than conventional crushers. Its precision machined toggle mechanism operating in a sealed, filtered oil bath reduces wear and friction to the absolute minimum. The Kue-Ken pendulum type swing jaw with no heavy reciprocating parts to lift operates with a far smaller flywheel requiring only a normal duty squirrel cage motor. In shop test, the 48″ x 42″ Kue-Ken crusher above is started by a 30 hp motor with a single vee belt and runs mounted on skids not fastened to the floor at the operating speed of 275 rpm on only 17 hp! The Kue-Ken pendulum jaw swings in an almost straight line and crushes rock squarely without rubbing. Full power is used to crush rock, not to wear out jaw plates. The Kue-Ken pendulum type action also provides maximum leverage where it counts most—at the top of the swing jaw for crushing large rocks. Operating smoothly, efficiently, Kue-Ken crushes at higher speeds for higher capacity and a more uniform product.

KUE-KEN CRUSHERS®

"CRUSHING without Rubbing"

STRAUB MFG. CO., INC. 8381 Baldwin St., Oakland 21, Calif.

Jaw Crushers Gyratory Crushers Overhead Eccentric Crushers Revolving Screens Classifiers Feeders Rib Cone Ball Mills Concentrating Tables Vibrating Screens

Pennsylvania Crusher Division, Exclusive Licensed Eastern Manufacturer and Distributor, 323 S. Matlock St., West Chester, Penn.
Armstrong Whitworth (Metal Industries) Ltd., Authorized Licensed Manufacturer and Distributor, Close Works, Gateshead-upon-Tyne 8, England

DEALERS:
SEATTLE, WASH., Washington Machinery Co. • VANCOUVER, B. C., Universal Equipment Co. • SALT LAKE CITY, UTAH, Lund Machinery Co. • SAN ANTONIO, TEX., Closner Equipment Co. • LOS ANGELES, CALIF., Garlinghouse, Freman Co. • SAN FRANCISCO, CALIF., Aggregate Engineers, Inc. • PORTLAND, OREGON, Air-Mac, Inc., of Oregon • BISMARCK, NORTH DAKOTA, Midwest Equipment Co.

Washington News Letter

(*Continued from page* 11)

gress, it may well turn out that the most advantageous place to locate a business could be Scranton, Pa., or Wheeling, W. Va., locations which have been by-passed in the search for ideal plant locations.

SAMUELSON TASK FORCE REPORT

Broad Economic Problems The report of the Samuelson task force considers broader economic problems. It, too, concerns itself with both the short-run and the long-run situations. However, it was found that these were very closely interrelated. According to the analysis of this group, the principal reason for the rapidly recurring recessions which appear to have been characteristic of the last few years is that there has been no strong upward push in the economy during that time.

These task force members came to the conclusion that when the economy is moving upward rapidly, the recessions are short and not very deep; but when the economy is at a relative standstill, they lengthen out and become deeper. Presumably, should the economy be going down generally, the "lows" would last longer, probably developing into full-scale depressions.

In the analysis of the Samuelson group the current situation is of the second type, namely a reasonably long and reasonably deep recession in a period of relatively slow economic advancement. Accordingly, it is their view that the solution of the problem of the present recession and of the longer-term problem of economic growth are interrelated.

In terms of a program, they plead for flexibility. Thus, they suggest a so-called "first line of defense" which would be used in the immediately ensuing months. Then, they recommend, the statistical indicators should be watched carefully, and if the situation is not significantly improved, we should move to a "second line of defense" policy.

First-Line Measures Among the first-line measures is the recommendation that the pledged expenditure programs desired for their own sake should be pushed hard. The task force members insist that such programs should not be postponed merely because the income of the Federal Government is reduced due to lower tax revenues resulting from the current recession.

Some of these first-line programs suggested are defense expenditures; foreign aid; education programs, including funds for school construction, teachers' salaries, and increased loans for college dormitories; urban renewal programs, including slum clearance and improvement of transportation facilities; health and welfare programs, including medical care of the aged, increased grants for hospital construction, and continued grants for medical research; improved unemployment compensation; useful public works programs; highway construction programs; depressed area programs; and natural resources development projects.

The Samuelson group also recommends the stimulation of residential housing although it is not believed that much expansion will occur in this area until the "war babies" begin to set up their own families in the next five years.

When it comes to monetary policy, the Samuelson task force recognizes the dilemma that if interest rates are reduced, this would aggravate the gold loss problem by encouraging foreign investors to withdraw from the United States and make investments in other countries. They suggest, although they do not prove, that the critical rate here is the short-term interest rate, which they claim is most decisive for foreign balances. Accordingly, they suggest a program which would raise short-term interest rates and reduce long-term interest rates. Exactly how this would be accomplished is a little unclear from the report, although it expresses full confidence that the Federal Reserve, working with the Treasury, could do it.

Second-Line Measures The principal item in the suggested second line of defense is the one which got the most publicity, namely the suggestion for a temporary tax cut which the members of this group characterize as a "powerful weapon against recession." It is significant that this group did not recommend that action unless the economy continues to sag seriously.

Wage-Price Spiral Finally—and this is a fact of great significance—this report indicates that there will have to be a direct attack on the wage-price spiral. It is noted that neither monetary nor fiscal policy is of much use in preventing the tendency for prices and wages to rise in advance of high employment. It is suggested that this is a challenge not only to the government but also to the private forces of industry and labor. This report no longer raises the question of the need for wage and price control but only the question of how that will be accomplished. With the publication of this report, it will no longer be possible to claim surprise when serious proposals for peacetime price and wage control are made.

Pakistan Considers Plans For Two Cement Plants

Plans for the erection of two cement plants in West Pakistan are reportedly being considered by Pakistan Industrial Credit & Investment Corporation. One plant, with a tentative annual capacity of 400,000 tons, would be built at Gharibwal near Jhelum; the site of the other has not been selected.

If approved, the plants are expected to be in operation within three years. The anticipated output is expected to relieve a critical cement shortage in Pakistan.

It has been reported that the Nesher Cement Company will add a third rotary kiln at Haifa, Israel, which would increase annual capacity by 60,000 tons. Long-range expansion plans include the construction of a plant at Eliat.

Italy took fifth place in world production of cement during 1959, showing a 12.7 percent increase over 1958. Only the United States, Russia, Germany, and Japan produced more.

A NEW-TYPE BAG!

BEMIS "RIDGLOK" Trademark REDUCES TRANSIT

This is important news for the rock products industry . . .

The new Bemis RidgLok-Extensibles, in which two types of extensible kraft are combined, have shown, in major tests conducted with two cement companies, only 50% as much breakage in transit as conventional extensible multiwalls, heretofore proved the most practical, economical cement bag.

WHAT'S NEW?

CLINGS LIKE A GLOVE . . .
RESISTS SLIDING . . .

The ridged, embossed outer ply of extensible kraft (really extensible in both directions) clings like a glove . . . resists sliding or movement in transit, so breakage is greatly reduced.

STIFFER BAG . . .
EASIER TO HANDLE . . .

Still another benefit: The embossed outer ply of Bemis RidgLok makes the bag stiffer . . . and the stiffer valve corner makes it easier to handle at the packing machine.

EXTENSIBLE MULTIWALL BREAKAGE 50%

SMOOTH INNER PLIES . . .

Inner plies are the regular type extensible kraft which Bemis pioneered in multiwalls. They resist shock and breakage... and the smooth surface releases contents of the bag fast and cleanly.

The different types of paper in Bemis RidgLok Multiwalls come from different paper makers. Bemis can give you improved bags like RidgLok because we have a range of paper supply.

Ask your Bemis Man for the complete RidgLok-Extensible story . . . you'll want the details.

BEMIS *where flexible packaging ideas are born*

GENERAL OFFICES—408 Pine Street, St. Louis 2—Sales Offices in Principal Cities

Labor Developments

(*Continued from page 13.*)

ginning to be attacked by a committee composed of representatives of the labor unions in the railroad industry, the railroads, and a number of public members under the chairmanship of former Secretary Mitchell.

This commission on feather-bedding resulted from an agreement between the railroads and the unions which provided that (1) all issues would be submitted to it; (2) it would begin work on or before January 15 and report back to the parties within 11 months; and (3) its recommendations would be advisory —not binding. This is the first really constructive effort made to solve a problem of long standing in the railroad industry.

Previously, the railroads would attempt to change the antiquated rules but in doing so, would meet the head-on opposition of their unions. They would, thereupon, bring these matters before a variety of fact-finding commissions, arbitration boards, etc., virtually all of whom side-stepped the issue because it was much too complicated to handle in those circumstances. The fact-finding commission approach seems to have the most likely chance of success, particularly because this is the first time that the unions have agreed to participate in serious discussions. That agreement presumes that there will be some changes coming out of the deliberations.

Unfortunately, unless business picks up substantially in the next year, during which this commission will be doing its work and preparing its report, the opposition to changes which will necessarily result in fewer railroad jobs will be great. On the other hand, if the economic situation were to improve greatly, it would be expected that the opposition would be less strenuous than otherwise because there would be alternative employment opportunities for those who may be displaced out of the railroad industry.

The best that can be hoped for in a declining employment situation are resulting agreements which may reduce the hiring of new personnel to replace those whose work is really not necessary; but it is very unlikely that under such circumstances there would be an elimination of presently employed railroad workers who in fact are contributing very little to the operation of the railroads.

A similar problem is arising in various areas where the program for automation is moving rapidly. Here, too, the opposition from potentially displaced employees is a good deal stronger than it would be if there were more jobs than men, rather than the current reverse situation.

The year 1961 also appears to be the year in which the labor movement will try to come to terms with the changing characteristics of the labor force. Ever since the end of World War II the areas of employment in which labor unions have been most secure—in manufacturing employment—have constituted a declining proportion of the total labor force.

The growing proportions of the labor force have been in the service industries and the so-called white collar employment. Despite the very large increase in manufacturing output there has been virtually no increase in manufacturing employment since the end of World War II. This static condition, more than anything else, accounts for the fact that the labor unions have not increased that employment by any significant proportion in the last 15 years.

Until a few years ago very little attention was paid to this problem, for many reasons, including the fact that the labor movement was itself engaged in internal warfare between its AFL and CIO branches. One of the motivating forces for consolidation of the two branches was the fact that the total movement had been losing ground, relatively. While the consolidation is still far from perfect, it is sufficiently stable so that the combined organization is devoting a good deal of time, effort, and thinking to the problem of organizing in areas that they have not so far penetrated successfully.

Of special importance is the fact that the unions now recognize that the old organizational techniques are not directly useful in organizing other kinds of workers. A recent thoughtful report issued by the Director of Research for the Industrial Union Department clearly sets forth the problem which has hitherto been almost unmentionable in trade union circles. The import of all of this is that in the future the drives for organization of office workers and other unorganized personnel are likely to be a good deal more successful because they will be undertaken more seriously and with more appropriate organizational techniques. It will no longer be possible for an employer to assume comfortably that his office and technical forces, which are currently nonunion, will continue in that status indefinitely.

The trends are certainly contradictory. While unemployment, automation, and the changing character of the labor force combine to reduce organized labor economic power, the unions' political power has never been greater. It should be no surprise to find that labor will use this political power effectively in its effort to rebuild its waning economic power.

LAB ASSISTANT'S LAMENT

A man from restless sleep awoke,
By a jangling telephone bell.
A worried voice said, "Hello Bill?
The rock has gone to hell.

"The mag is higher'n Haiman;
The calcium is low.
What can I do with rock like that,
Is what I'd like to know.

"I hate to call this time of night,
And rouse you from the sack;
But I'm in a mess and all shook up,
And the foreman's breathing down my back.

"Fifteen men on the maint'nance gang
Are yellin' to be fed.
The pumper's screamin' for some mud
And I just broke my pencil lead.

"The Blaine was 1645,
Got an X-set on the pat;
Valve is plugged on a slurry line—
Someone must have lost his hat.

"That star bin is heaped like an ice cream cone.
The lo is mixing with the gray.
If A.S.T.M. gets a load of that,
We'll have the devil to pay.

"The basin moisture is thirty-six;
We just lost another mill—
Outside of that we're doing fine.
Thank you, sir, and good nite, Bill!"

—Ferguson

MANITOWOC 4500 VICON®

the only *really new* excavator design since steam!

This big 7-yd. VICON dragline removes 5,500 yards of shale and sandrock overburden every 10-hr. shift. Making 40-ft. deep cuts, the 4500 VICON is equipped with a 100-ft. boom.

The Manitowoc Model 4500 VICON represents the most outstanding advancement of excavator design in decades. Here is a 6 yard shovel or 7 yard dragline incorporating new, tested design principles to give you more yardage in less time than any other mechanical or electrically driven shovel-drag in this size range. Thoroughly proved on the job for over three years, VICON design has increased yardage 25% or better, substantially reduced maintenance costs, and piled up more profits for owners. Some exclusive VICON features are:

INTEGRATED CONTROLS that serve both as clutch operating levers and as engine throttles, providing variable speed control over each function. Clutches, being responsive to lower range of control pressures, are engaged before engines are accelerated. Slippage and overheated friction surfaces are eliminated, lengthening clutch life appreciably.

HOIST AND DRAG DRUMS ARE INTERLOCKED to automatically synchronize their operation. Cycle time is faster and output is greater because full horsepower is always available for hoist—the operator doesn't "soak" it up with the drag brakes. Operating costs are noticeably less because brake use is cut by 50% and lining wear is drastically reduced. Another advantage of the VICON interlocked drum arrangement is that the operator can "power lower" or free-cast the bucket.

DUAL INDEPENDENT ENGINE POWER with one engine powering the main drums, and the second all other functions. Here are all the advantages of electric or conventional diesel engine mechanical drive without the disadvantages of each. You get the performance characteristics of electric drive — smoother power flow, variable independent speed control, simultaneous operation of dig, hoist, swing, and propel functions—without sacrificing mobility, without incurring the headaches and special maintenance problems of electric drive, without needing a separate power source at every job site. You get the simplicity of mechanical drive without losing valuable production time because of engine "lug down", without needing to jam clutches into engagement at high and harmful engine speeds, without the limitations of operating speeds that are inherent in conventional diesel engine drive.

Why not get the complete story on the *sensational* Model 4500 VICON today? Your nearby Manitowoc distributor has all the facts.

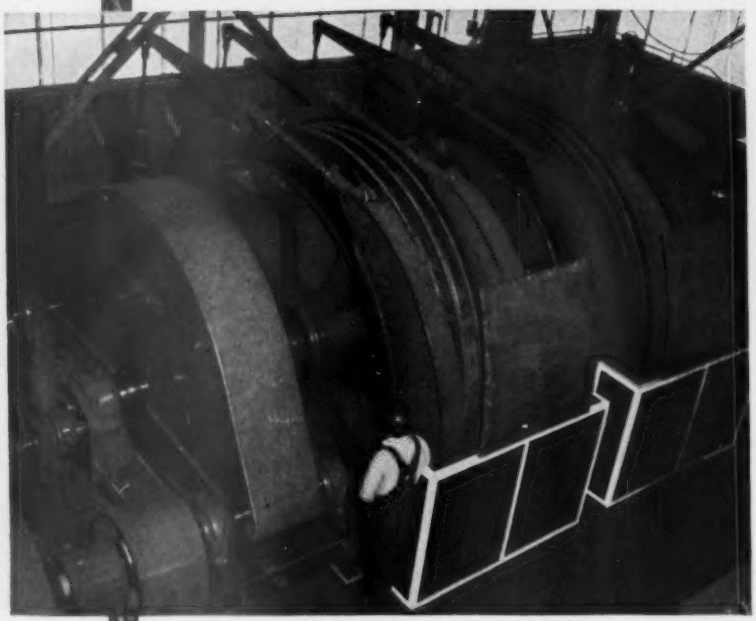
MANITOWOC

9-A1 *Variable Independent Control

Manitowoc

MANITOWOC ENGINEERING CORP.
(A subsidiary of The Manitowoc Company, Inc.)
Manitowoc, Wisconsin

SHOVELS	CRANES	DRAGLINES	TRENCH HOES
1¼ — 6 YDS.	25 — 125 TONS	1¼ — 7 YDS.	1¼ — 3 YDS.



Hoists in the shaft tower.

Steel

For strength
. . . economy
. . . versatility

BETHANIZED WIRE ROPE SERVES HOISTS IN NEW HOMER-WAUSECA SHAFT

These friction hoists in the Homer-Wauseca iron ore mine are operated at Iron River, Mich., by the M. A. Hanna Co. The capacity of the hoists is 300 long tons per hour at 1,500-ft depth per hoist. The twelve hoist ropes used on the three lifts, 2,900-ft long, are 1-in. 6 x 27 H Bethanized Form-Set, improved plow steel, flattened strand, with fiber core. The 2,810-ft tail ropes are 1⅜-in. 18 x 7 Form-Set, traction steel, right lay, with fiber core, in Bethanized A and B coatings. The Bethanized coatings of high-purity zinc are applied electrolytically to the individual wires. Since the amount of lubrication on the ropes must be limited to maintain friction, the Bethanized coatings were chosen to provide extra corrosion-resistance.

Whatever the lifting assignment, you can count on Bethlehem Wire Rope for top performance . . . every time.

BETHLEHEM STEEL COMPANY, Bethlehem, Pa.
Export Sales: Bethlehem Steel Export Corporation

BETHLEHEM STEEL

There's a distributor of Bethlehem Rope near you, supplied by our nationwide network of wire rope mill depots.

BETHLEHEM WIRE ROPE
BETHLEHEM STEEL

Industry Personalities

V. P. Ahearn Jr.

VINCENT P. AHEARN JR. has rejoined the staff of the National Sand and Gravel Association as of November 14, following three years of duty in the armed services with the U. S. Navy. Mr. Ahearn had worked on the staff for some time prior to his military service.

His educational background includes degrees from Harvard (A. B.), and from Georgetown University (LL.B). His duties as assistant to the associate managing director will include work in such important areas as industry public relations, and the association's outstanding conventions.

JAMES P. CONNELL has been appointed to the newly created post of director of industrial relations at Lake Ontario Portland Cement Company Ltd., Toronto. He has previously held similar positions with Union Carbide Canada Ltd., in its bakelite division, and later in its chemicals and plastics division.

DR. ALAN D. FRANKLIN was recently named chief of the Mineral Products Division of the National Bureau of Standards in Washington, D. C. Dr. Franklin had been serving as acting chief since November, 1959, when he succeeded DR. IRL C. SCHOONOVER. The latter is now the bureau's associate director for planning.

A. VICTOR ABNEE has been named general advertising manager of United States Gypsum Company, and HOWARD W. JARVIS has been appointed sales promotion manager of the firm's mid-continent region.

DR. I. MILTON LEBARON, director of research, engineering, and development, International Minerals and Chemical Corporation, was one of ten American scientists invited to participate in an international physics symposium on high-voltage electrostatic forces in Grenoble, France.

The symposium was sponsored by the French National Scientific Research Center. Dr. LeBaron delivered an address on *Electrostatic Separation of Minerals*. He is the holder of 27 patents in minerals processing.

DAN J. O'CONOR JR., president and general manager of Formica Corporation, has been named a vice-president of American Cynamid Company. Formica is a subsidiary of American Cynamid. Mr. O'Conor will serve as an operational officer of the parent firm.

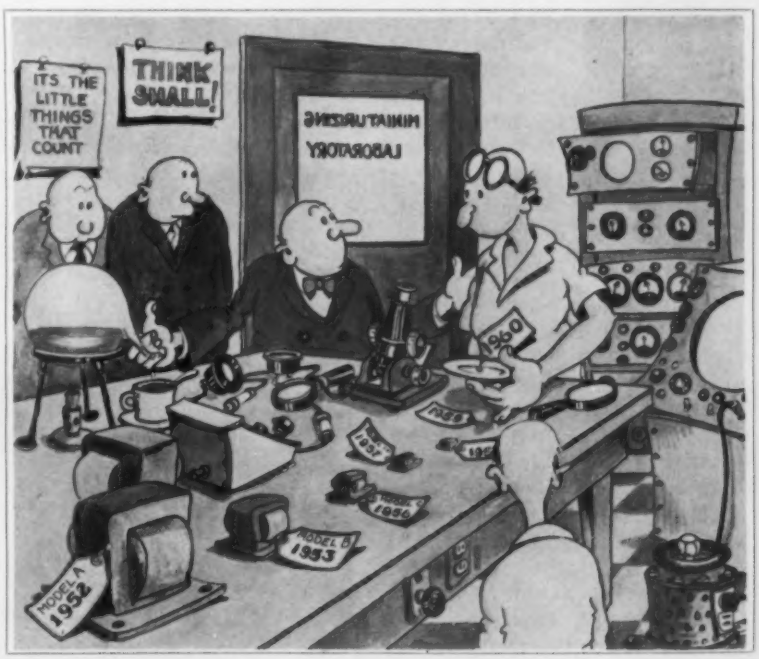
LEONARD R. FLICKER, director of safety for Permanente Cement Company, Oakland, Calif., was elected to serve on the membership committee of the Cement and Quarry Section of the National Safety Council during the recent meeting of the National Safety Congress.

BRUCE S. CAMPBELL, chairman of the board of Harry T. Campbell Sons' Corporation, Towson, Md., was selected the man of the year (1960) by the Greater Towson Chamber of Commerce.

HARRIS N. SNYDER, president of the Buffalo Slag Co., Inc., Buffalo, N.Y., has been elected a member of the executive committee of the American Steamship Company of Buffalo.

● "Look at it this way, Pefley. You wouldn't want to 'miniaturize' yourself out of a job, would you?" queries the boss.

The trend among instrumentation designers to make automatic control devices smaller and smaller is satirized in the 1961 calendar of Minneapolis-Honeywell's Brown Instruments Division. The calendar, now in its 24th year, is prized throughout the industry. Bill Eddy, inventor-businessman, is the creator of the mirth-provoking cartoons.



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DONALD A. McCRIE has been named Buffalo district sales manager of the Huron Portland Cement Company, a subsidiary of National Gypsum Company. He was formerly Detroit division sales representative and succeeds VICTOR F. HUMMELL, who remains at Buffalo.

B. W. HAMILTON has been named general sales manager for the Southern Pacific Milling Company, Ventura, Calif. Mr. Hamilton has been employed by the company since 1954 and most recently has been in charge of sales for the Ventura-Oxnard area. Prior to this he was affiliated with Montalvo Rock Company, now a division of Southern Pacific Milling.

SAM WILLIAMS, formerly sales manager for the company in the Santa Maria-Vandenberg Air Force Base area, succeeds Mr. Hamilton.

EDWARD F. GILL has been promoted to the post of manager, New York Trap Rock Corporation, West Nyack, N. Y.

Edward F. Gill

Mr. Gill, who joined Trap Rock in 1955, was previously assistant sales manager.

P. A. Gaebe

PHILIP A. GAEBE has been appointed to the new position of product manager, refractories, for the Kaiser Refractories & Chemicals Division, Kaiser Aluminum & Chemicals Sales, Inc., Oakland, Calif. In his new position, Mr. Gaebe will assume responsibilities in connection with customer relations and in maintaining liaison between the Oakland headquarters and the field sales staff. He was formerly assistant general sales manager of the Eastern Division.

HAROLD B. DAVIDSON, who has been serving as manager of sales service, was named assistant to the general manager at Pittsburgh.

A. S. ARCARI, former assistant manager, became manager.

R. G. TREVORROW has been promoted to the post of vice-president, finance; and Raymond Coyle has been named vice-president, sales, for Pacific Cement & Aggregates, San Francisco, Calif.

A number of promotions at Ottawa (Ill.) Silica Company have been announced. ROBERT STAUBER will be manager of the Crystal Silica Company, a California subsidiary. EDMUND B. THORNTON was appointed vice-president in charge of corporate development, and PAUL A. GERDING was named vice-president in charge of operations.

HOWARD B. KING, Burrell Construction and Supply Co., New Kensington, Pa., has been elected president of the Bituminous Concrete Association of Pennsylvania.

JACK REIF, owner of the Ozaukee Sand & Gravel Company, Milwaukee, Wis., has been elected president of the newly organized Greater Milwaukee Gravel Producers Association. Other officers are JOHN BABICH, Hales Corners Sand & Gravel Co., vice-president; and WILBERT FRENZ, Ernst Sand & Gravel Co., secretary-treasurer.

Two men have been named to newly created posts at Dundee Cement Company, Dundee, Mich.

RAYMOND S. CHASE, who has been sales manager for Dundee since June, 1959, has been appointed vice-president in charge of marketing.

WERNER OSTBERG, who has been plant manager, has been appointed vice-president in charge of operations.

W. Ostberg

R. S. Chase

JAMES D. MORAN has been named assistant to the president of The Flintkote Company. He will handle special staff assignments under the direction of the president.

J. D. Moran

Mr. Moran is also an assistant vice-president of Flintkote.

BOYCE F. MARTIN, president of Louisville Cement Company, has been elected president of the Louisville (Ky.) Chamber of Commerce.

WALTER H. WULF, president of the Monarch Cement Company, Humboldt, Kans., was recently named one of a group of Kansas and Missouri business and professional men who are making a 25-day goodwill tour (by air) of five South American countries.

Obituaries

JAMES ALBERT GAUTIER, who (with his brothers) founded Consumers Rock and Gravel Company in the San Fernando Valley, Calif., died on January 8. In 1929 Consumers merged with Union Rock Company to become Consolidated Rock Products Company of Los Angeles.

JOHN G. WEST, 66, who had been vice-president of the Lone Star Cement Company for 38 years and manager of the company's Indiana division, died recently at Indianapolis, Ind.

FRANK M. MYERS, 86, president of Joplin Cement Company, Joplin, Mo., died after suffering a heart attack. He had operated the company from 1915 until he retired from active management in 1958.

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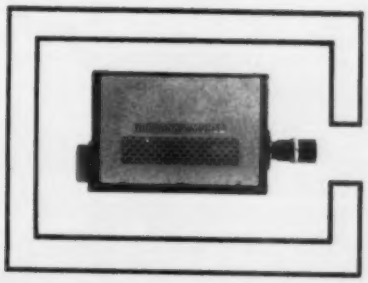


SEE IT HOT... AND SAVE

WITH TELEVISION BY FAIRBANKS MORSE

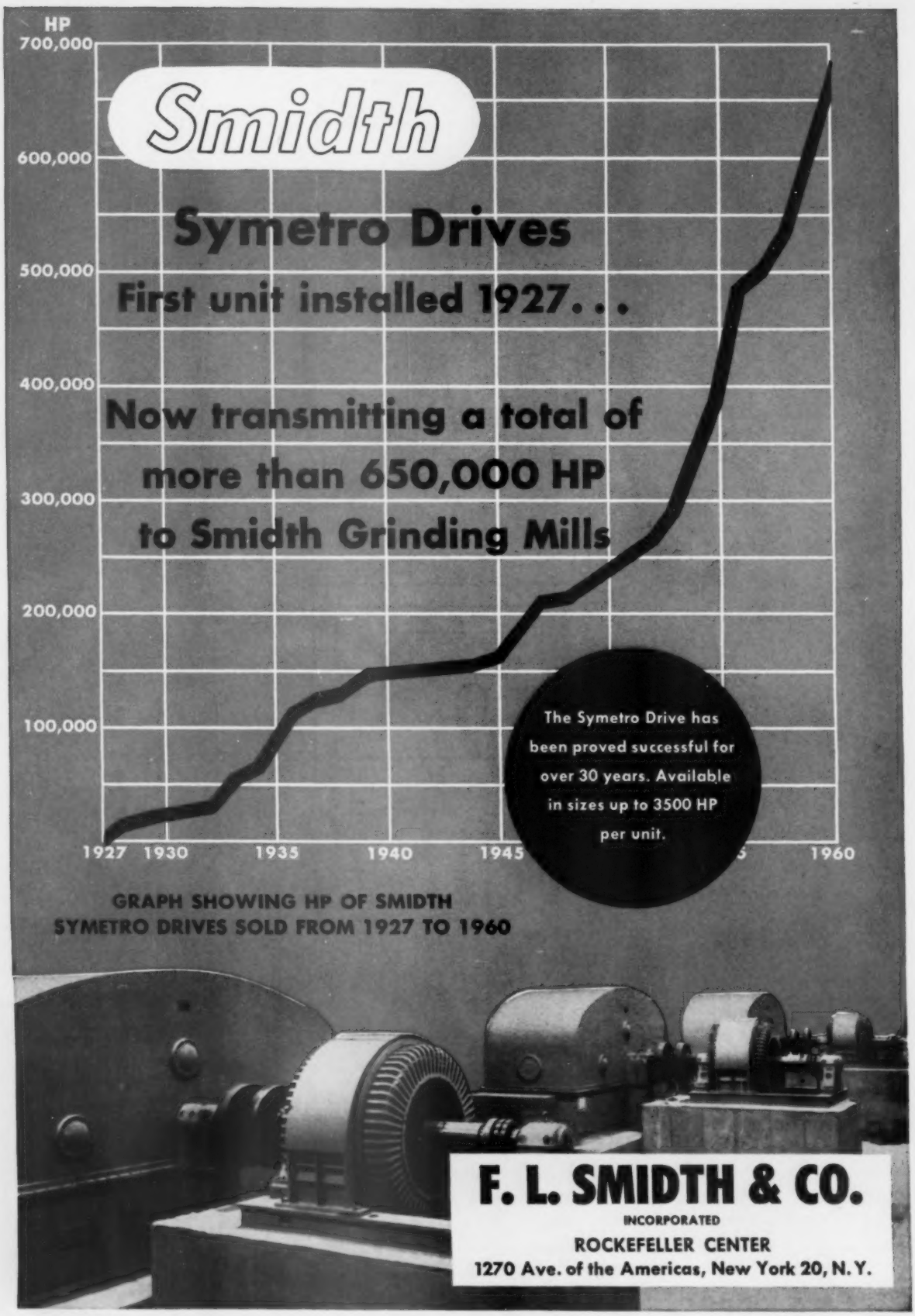
How much can you save in fuel and time by seeing when fired materials are ready to go... the molten glass or metal or clinker, the burning ceramic, the glowing steel strip?

How much do you lose each year through flaws in such hot materials as these... that wouldn't be lost if the flaws were seen?

You get unique continuous visual control of these hot spots with Fairbanks Morse Closed Circuit TV. In comfort, too. Water-cooled Fairbanks Morse TV cameras can chuck the combustion zone, molten flow and clinker grates of a cement kiln, look into a blast furnace, keep close watch on glowing metal in rolling mill or foundry. In fact, all high temperature combustion areas may be monitored for easy watching by the operator and shift supervisor (who can't be water cooled). Further, your plant manager may watch the entire operation from his office 2000 feet away. Let your imagination be your guide to savings by seeing... with Fairbanks Morse TV. Full information is yours for the asking from: Electronics Division, 505 Oakwood Avenue, West Hartford, Connecticut or your nearest District Office listed below.

FAIRBANKS MORSE
ELECTRONICS DIVISION
A MAJOR INDUSTRIAL COMPONENT OF
FAIRBANKS WHITNEY

FAIRBANKS MORSE, ELECTRONICS DIVISION: CLOSED CIRCUIT TELEVISION, OSCILLOSCOPES, RADIATION MONITORS, AUTOMATIC WEIGHING AND PROPORTIONING EQUIPMENT. DISTRICT OFFICES: 760 LEE STREET, S. W., ATLANTA, GEORGIA; 1550 S. STATE STREET, CHICAGO, ILLINOIS; 1713 N. MARKET STREET, DALLAS, TEXAS; 19-01 ROUTE 208, FAIRLAWN, NEW JERSEY; 220 EAST 5th STREET, ST. PAUL, MINNESOTA; 630 3rd STREET, SAN FRANCISCO, CALIFORNIA. SERVICE IN OTHER PRINCIPAL CITIES.


HP
700,000
600,000
500,000
400,000
300,000
200,000
100,000
1927
1930
1935
1940
1945
1960
Smidth
Symetro Drives
First unit installed 1927...
Now transmitting a total of more than 650,000 HP to Smidth Grinding Mills
The Symetro Drive has been proved successful for over 30 years. Available in sizes up to 3500 HP per unit.
GRAPH SHOWING HP OF SMIDTH SYMETRO DRIVES SOLD FROM 1927 TO 1960
F. L. SMIDTH & CO.
INCORPORATED
ROCKEFELLER CENTER
1270 Ave. of the Americas, New York 20, N. Y.

The Editor's Page

Highway Program Jeopardized— Diversion a Major Factor

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There is no pat answer to the troubles of the highway program; they are too many and too complicated. It is well known that the original $27.6 billion program has grown to $40 billion. The mileage involved has been increased, construction costs have risen sharply, and the program is being burdened with billions of dollars of costs not originally intended. Poor advance planning was also probably a factor—the bridge clearance fiasco alone is expected to cost another $1 billion. Additional highway user taxes were added, but not enough to compensate for these losses. Other relief promised will probably also be inadequate.

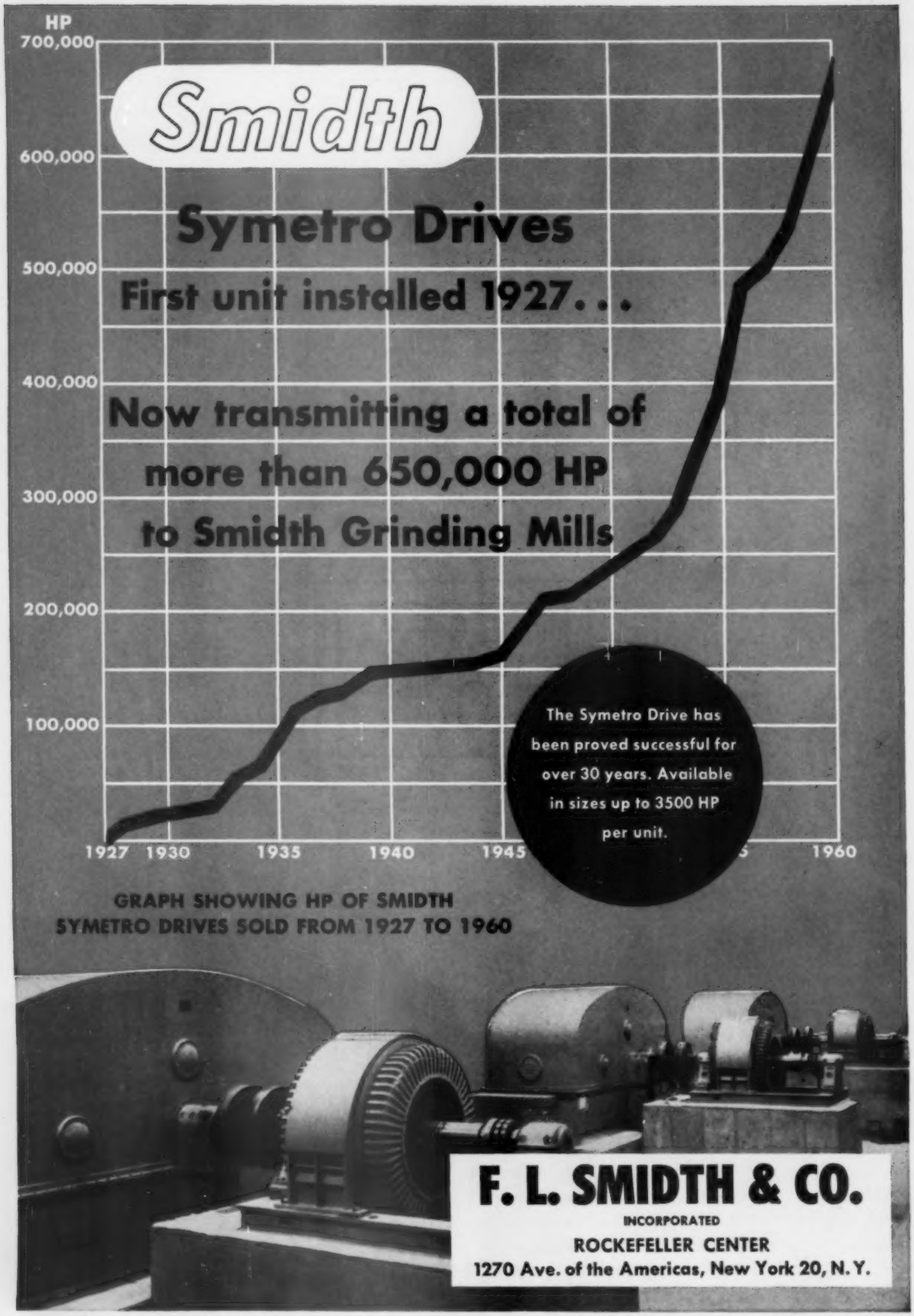
COMPARATIVELY little is being done to correct the condition which is probably the main cause of our highway financing troubles. This is the diversion of state and federal motor vehicle taxes for uses other than highways. An average of $1.7 billion in federal automotive excise taxes goes into the General Fund annually, while the highway fund declines. Over $300 million of automotive tax money on the state level is diverted each year—in 1959 this figure jumped to $450 million, and there was probably no decrease in 1960.

A total of 27 states have antidiversion provisions in their constitutions, and others prohibit diversion by statute, but this siphoning off of funds continues to increase. It is obvious from the continual stream of information coming in on diversion efforts that there will be no let-down, and some of these efforts are bound to be successful unless each one individually is quickly and effectively attacked.

AUTHORITIES agree that the now diverted highway funds would put the Interstate Highway Program back on its feet financially and keep it there. Congress has promised to correct at least a part of the trouble. On July 1, 1961, when the temporary one cent addition to the gasoline tax is slated to expire, a portion of the now diverted funds will start going to the Highway Trust Fund on a temporary basis.

Further funds would be saved by enforcing stricter antidiversion safeguards on both the state and national levels. Both of these objectives can be attained if all interested groups will make their wishes known to legislators on both levels.

Walter E. Trauffer



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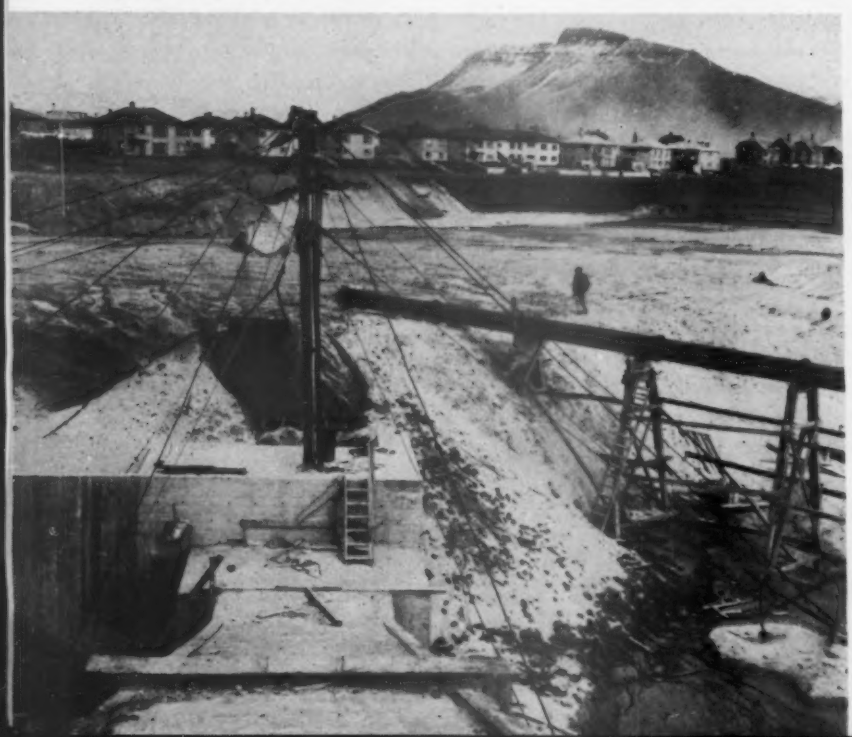
Walter E. Trauffer

Iceland

AN AERIAL VIEW of the new government-operated cement mill at Akranes, Iceland. The discovery of shell sand in Faxa Bay assured an adequate supply of lime for the development of this long-planned operation.

By JON VESTDAL
Plant Manager
Iceland Government Cement Works

STORAGE. Shell sand brought about 10 nautical miles from Faxa Bay is pumped into the storage area for subsequent recovery by drag-scraper, left, and feed into the mill.



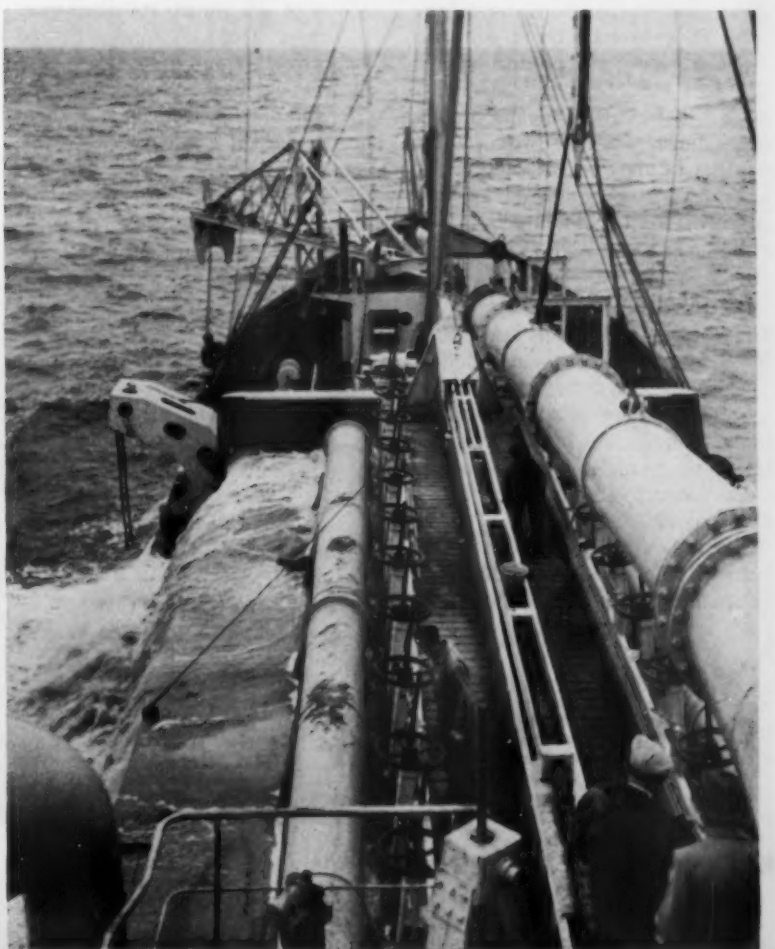
ANOTHER P&D EXCLUSIVE

ABOUT the turn of the century there were virtually no buildings in Iceland that could be considered as enduring. In view of the material they were made of, it was considered good if they lasted 50 years. Ever since the time of the settlement of the country each generation—or at least every second generation—had to build up the country anew. Yet the people cannot be blamed for this situation because of incompetence or lack of enterprise, as enterprise is no greater now than it was in past centuries. The cause is rather to be found in the fact that the building material used was the only one available, and buildings

Relies on Sea for New Cement Industry

• Long planning fruitful in meeting country's needs for building material

DREDGING. The "Sansu" in action. Dredging methods and equipment were devised to overcome some formidable problems, including depth, ocean swells, and the relatively thin bed of material to be recovered.



made of it could last but a short time in a climate peculiar to this country.

CEMENT—CHIEF BUILDING MATERIAL

High per Capita Consumption The Icelanders, therefore, welcomed the new building material, portland cement, which came into use in the second half of the last century. Since the beginning of the 20th century it has steadily gained ground, surpassing all other building materials, so that there is scarcely a building which is not largely or wholly made of concrete. Hence the enormous *per capita* consumption of cement in this country, which is the highest in the world. In 1958 this figure reached its peak, 1,227 lb. per inhabitant,

A VIEW OF THE SHELL SAND STORAGE AREA and drag-scraper, lower right, pulling material into the feed hopper.

but the average of the last five years was 1,093 lb.

This country's need for its own production of cement is obviously great, and preparations have long been in progress. There are two main reasons why production did not start until two years ago: (1) there was too little demand for cement during the first two or three decades of the present century for a cement factory to be a paying concern; and (2) there was a lack of suitable raw materials.

SHELL SAND RECOVERY

Origin of Shell Sand The chief raw material for the production of cement is lime. In Iceland limestone is nowhere to be found in quantities large enough to satisfy the needs of a cement plant, as the country is almost solely made up of basaltic rocks.

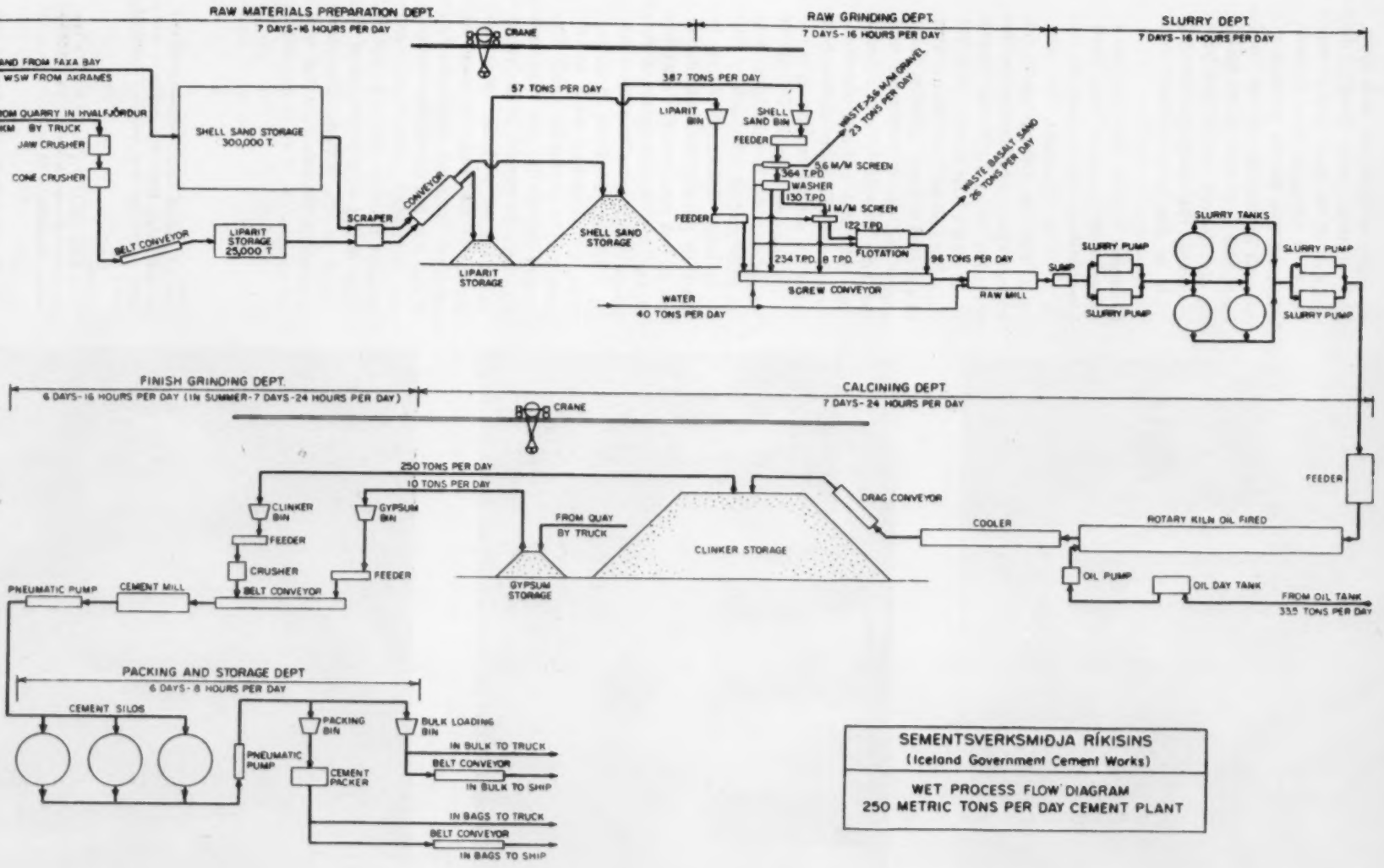
Only the lime formed by mollusks in the fjords of Iceland is obtainable in large quantities. The growth of mollusks in some places is rapid, and the shells are almost pure lime. When the animals die, the shells are disintegrated by the action of the water, and shell sand is formed. This shell sand is carried by currents from the place where the animals lived and sometimes accumulates on beaches or elsewhere in the lee of currents and wave action.

Large quantities of this shell sand are to be found on the beaches of some fjords in the northwestern part of the country; and it was with a view to utilizing it in manufacturing that the possibilities of producing cement were explored. The location of the shell sand, however, far from the main market area for cement in Iceland, and other circumstances in many ways unfavorable caused the utilization of this raw material for the production of cement to be considered impracticable.

Difficulties in Recovery It was not, therefore, until shell sand was discovered on the bottom of Faxa Bay in 1949 that determined efforts were made to build a cement plant. But the location of this shell sand presented many handicaps for the dredging. An important drawback was the depth of the water—115 to 135 ft. Sand had never been dredged from such a great depth when the operation was begun in Faxa Bay in 1953.

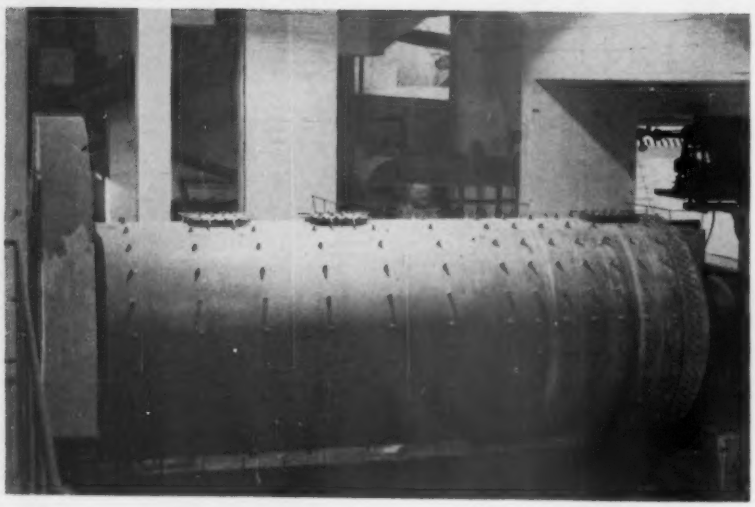
Another factor to be remembered in connection with the sand in Faxa Bay is that the bay lies open to

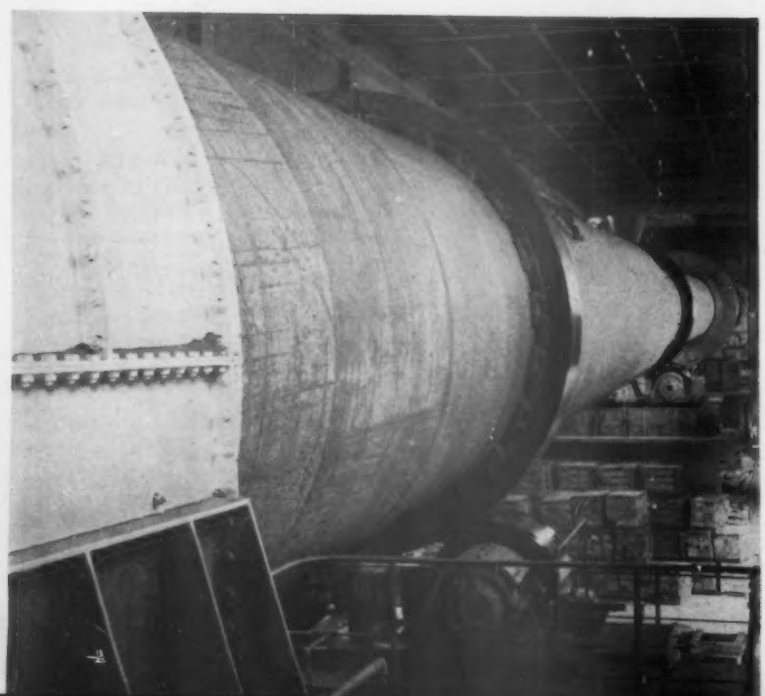
THIS RHYOLITE AREA from which the silica component is provided was discovered at about the same time as the bay bottom beds of shell sand. The quarry is about 24 miles from Akranes.



SEMENTSVERKSMIÐJA RÍKISINS
(Iceland Government Cement Works)

WET PROCESS FLOW DIAGRAM
250 METRIC TONS PER DAY CEMENT PLANT





the ocean; so there may be a heavy swell in these parts. Finally, the thickness of the sand layer is only 3 to 13 ft. Owing to these unfavorable conditions for the dredging of the sand in Faxa Bay it was found inadvisable to embark on the building of a factory until it had been ascertained that dredging of the sand could be done at a moderate cost.

Dredging Experiment Launched

For that purpose a dredger was chartered to make the experiment. The ship, fitted with special equipment of various kinds most suitable for the operation, is an 1,100-ton (gross) vessel with a hold capacity of 1,000 cu. yd., or about 1,600 metric tons of wet sand. It has a 1,200 hp. diesel engine that can be connected with the ship's propeller or with a pump. The latter is a 5-armed centrifugal pump connected to the suction pipe below the surface of the sea.

The suction pipe is 160 ft. in length, so that the dredging may be performed at the depth of 140 ft. Its inside diameter is 24 in. In order to prevent the breaking of this suction pipe through the motion of the ship, it was made of two pieces, which were then connected by a rubber manchette. Both sections are suspended from a wire connected to a hydraulic pump. The bottom end of the pipe thus rests with only 20 percent of its weight on the bottom, while the rest is supported by the wires. In case the strain on the wires increases—*i.e.*, if the ship heaves on the waves—the hydraulic action starts and slackens the wire until the pipe is again resting with 20 percent of its weight on the bottom. The same happens if the strain on the wire decreases— *i.e.*, if the ship is in the

Top:
THE CRUSHING-AND-SCREENING PLANT at Hvalfjordur, where the rhyolite is processed before the truck haul to the cement mill.

Middle:
THIS RAW MILL (9½ by 29 ft.) is a two-compartment unit driven by an 1,100-hp. motor. Capacity is 25 t.p.h.

Bottom:
THE OIL-FIRED KILN is 10½ by 9 by 10½ ft. in diameter, and 333 ft. long. It is equipped with a preheater and a chain system.

trough of a wave; the action starts automatically and pulls at the wires. The pipe can thus be moved 6 ft. up or down.

This equipment proved successful, and the dredging operation was not interrupted although the waves rose to the height of 10 ft.

During the operation, the ship could not lie still because of the thinness of the sandlayer. An anchor was therefore dropped from the ship's stern, attached to a wire, and the ship traveled a distance of about 450 yards, facing the waves. The ship then stopped, its bow anchor was dropped, and the suction pipe was lowered to the bottom. The pump was started before the pipe reached the bottom, but when sand appeared in the seawater, the wire attached to the stern anchor was pulled, and the ship thus slowly moved astern during the dredging operation while the main anchor was dragged along the bottom. In this way the ship could be kept almost steady across the waves preventing rolling, which might easily have caused the pipe to break. Thus only the top layer of the sand was dredged.

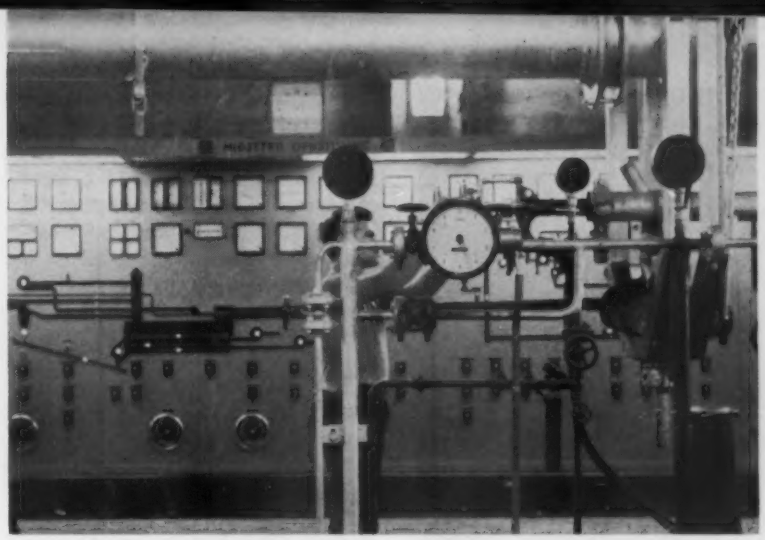
The distance from Akranes, the plant site, to the shell sand grounds in Faxa Bay is about 10 nautical miles. In the summer of 1953 each trip took about 6½ hours, so that on the average 3¾ trips were made in 24 hours and 4,700 tons of shell sand were landed daily.

Since the beginning of plant operations sand has been dredged twice from the bottom of Faxa Bay in the same place as the site of the first dredging in 1953. The results were the same as the first operation. However, the lime content of the shell sand has increased somewhat with every dredging.

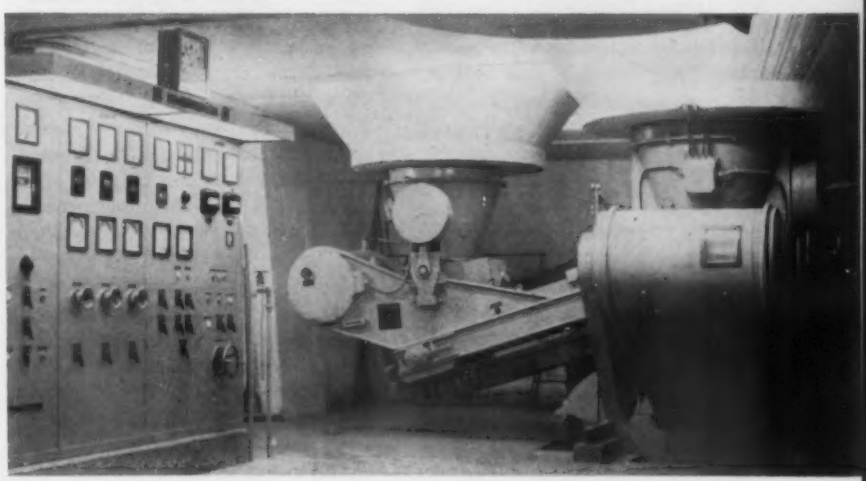
The ship used for the dredging, the *Sansu*, is owned by J. G. Mouritzen & Co., Ltd., Copenhagen.

RAW MATERIALS

Lime Component The shell sand dredged from Faxa Bay is a mixture of broken shell and tuff particles containing about 80 percent of lime ($CaCO_3$) *i.e.*, four-fifths of it is shell, and one-fifth tuff. Tuff has the same chemical composition as basalt and contains 40 to 50 percent of silica besides iron and aluminum oxide,

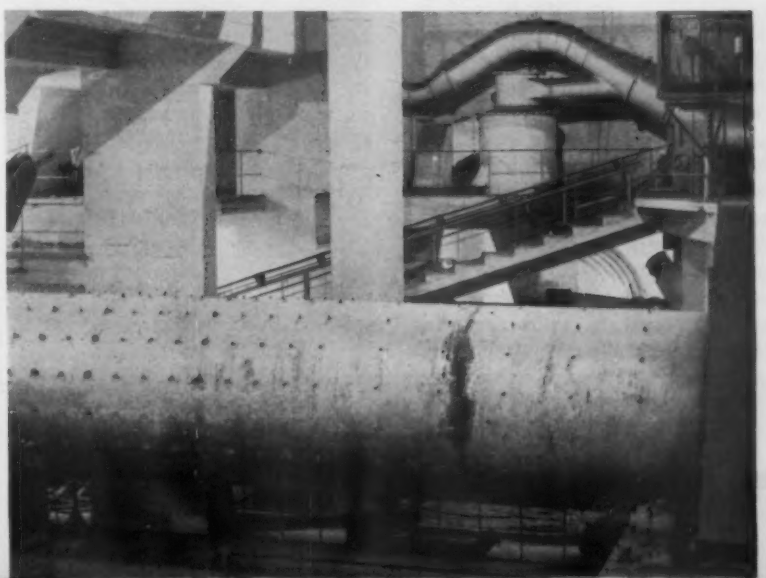


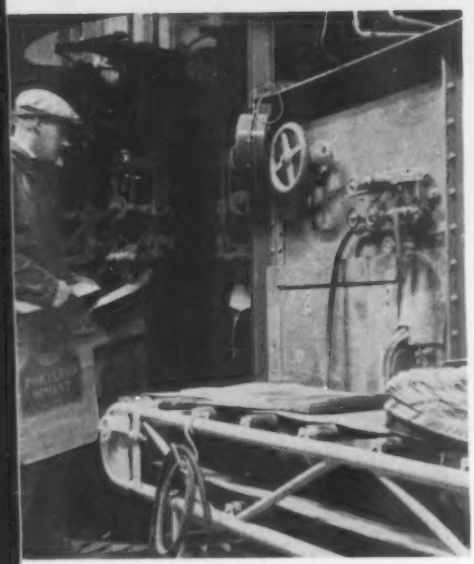
Above:
VIEW ON THE FIRING FLOOR. In the background is the control panel for the kiln and auxiliaries. In the foreground (below the burner pipe) are the oil meter and controls.



Above:
THE MILL CONTROL BOARD (at the left) and (at right) two of the feeders for the finish mill.

Below:
THE FINISH MILL, a three-compartment unit, is 8 ft. in diameter and 36½ ft. long. It is driven by a 900 hp. motor and has a capacity of 22 t.p.h.





THE 12-SPOUT PACKER FILLS and weighs 2,000 bags per hour. From this point, bagged cement is conveyed to the truck- or ship-loading dock.

the silica ratio being 1.4 to 1.6. The tuff is therefore not sufficiently rich in silica to be the sole material (together with lime) for the production of cement. In most places siliceous clay is added to the lime to increase the silica ratio up to 2:4.

In Iceland, however, such clay is not to be found. All clay there has a chemical composition similar to that of basalt; in other words, it does not contain sufficient silica. Moreover, in Iceland minerals rich in silica are very rare.

Silica Component The only siliceous mineral that might be considered is rhyolite; and by a happy coincidence, rhyolite was discovered in Hvalfjord, about 24 miles from Akranes about the time that shell sand was discovered in Faxa Bay. This kind of rhyolite, called perlite, is now used for increasing the silica content of the slurry for the production of cement; it contains 75 to 80 percent silica. It is blasted from rocks in Hvalfjord and crushed there by two stages to grain size, plus 0.4 in., so that the raw grinding mill can receive it and grind it still finer. The rhyolite is brought by lorries from Hvalfjord to the crane house of the factory at Akranes, an operation which continues 4 to 5 months of the year during the summer. The slurry is made of 10 to 15 percent rhyolite, the rest being shell sand.

The rhyolite requires no treatment other than crushing before it is fed into the raw-grinding mill.

SHELL SAND FLOTATION

The shell sand contains on the average about 80 percent lime, as already mentioned, sometimes a little more, but sometimes also a little less. That lime content is hardly sufficient for a first-rate portland cement. The factory at Akranes therefore has flotation equipment for increasing the lime content.

The preparation of the shell sand starts with a screening process, during which all minus 0.4-in. particles are separated. The minus 0.4-in. fraction amounts to about 5 percent of the shell sand and contains about 25 percent lime, the rest being small tuff stones. This fraction can be used for pozzolan cement.

After this first screening process the plus 0.4-in. fraction is washed in a turbomixer with fresh water in order to remove sea water from it, as the sea water contains a considerable amount of alkalies, especially sodium. After the washing, the sand is screened on a 0.02 in. (28-mesh Taylor) screen. The plus fraction from this screening process runs direct to the raw-grinding mill and is fed into it by a screw conveyor.

The minus fraction, however, is separated from the water in a rake classifier, mixed with the flotation agents, and transported by a screw conveyor to the eight flotation cells. This minus fraction, being 20 to 30 percent of the sand, contains only 50 to 60 percent of lime. By the flotation process, it is separated into shell fragments and tuff particles. The shell fraction contains 90 to 95 percent lime after the flotation process, while the waste, *i.e.*, the tuff fraction, contains only a small amount of lime—about 10 percent.

In this way the lime content of the slurry can be fully controlled although the composition of the shell sand may vary.

The flotation process is easily applied to shell sand as it is unnecessary to pregrind it, and only its finest fraction needs flotation.

CEMENT PLANT

The production of cement in the plant at Akranes does not differ from that of similar plants, with the exception of the above-mentioned flotation, which is not common in this field. The plant uses the wet process, as the main raw material, the shell sand, is saturated with water when received.

Raw Material Storage Because of the weather condition in Faxa Bay, where shell sand is reclaimed, the dredging operation can be carried out only during four or five months in the summer. Thus, a large stockpile must be maintained to satisfy the demand for the plant over extended periods. The storage area can hold up to 400,000 tons of shell sand.

Reclamation of the shell sand from the stockpile is carried out by a 1½-cu. yd. Sauerman drag-scraper machine with an operating span as high as 500 ft.

Three steel bridle towers support a rapidly shifting bridle anchor assembly located at the perimeter of the storage area. The span between the towers is 200 ft. When all the shell sand has been reclaimed from one section of the storage, the guyed towers are relocated to reclaim another pie-shaped segment of the storage. The towers are usually relocated every 3 to 4 months.

The drag-scraper bucket delivers the shell sand to a grizzly hopper located in front of a 25-ft. head post. A small conveyor below the hopper feeds a 260-ft. conveyor belt which takes the shell sand to a vibrating screen. Plus 0.4-in. material is screened away and carried from the plant as refuse. The minus 0.4, which is the consistency of 95 percent of the shell sand, is conveyed to bins to await plant processing.

Raw Grinding The raw-grinding mill, 29 ft. in length and 9.7 ft. in diameter, is divided into two compartments. It is driven by an 1,100-hp. electric motor and can grind 25 tons of raw material per hour. The slurry contains 35 to 36 percent water. The fully ground slurry is pumped from the raw-grinding mill into four slurry silos, where the slurry is agitated and homogenized by the injection

of pressurized air. From the slurry silo, the slurry enters the rotary kiln.

Kiln Department The rotary kiln is a very economical unit, with preheater and a chain-system; it is 10.5 ft. in diameter at each end and 9 ft. at the center and 333 ft. long. It has a capacity of 325-350 tons of clinker per 24 hours. Bunker C fuel oil is used for burning.

Clinker, when fully burned, drops from the kiln into a 19-sq. yd. grate cooler, the Folax cooler. There the clinker is subjected to a so-called air quenching effect. Some of the draught from the cooler is used for the burning of the oil in the kiln. From the cooler the clinker is transported by a drag chain conveyor to the crane house, and from this point the crane transports it to the feeder.

Finish Milling Capacity of the 8- by 36.6-ft., 3-compartment Unidan mill is 22 tons of regular portland cement per hour. This large output is necessary to accommodate the heavy demand for cement during the summer months.

Automatic weighing of the feed is done by Pendan feeders, controlled by a Folafon acoustic gauge. The mill is driven by a 900-hp. electric motor.

When fully ground, the cement flows from the mill into the Flux pneumatic pump which sends the cement a distance of about 225 yd. into silos 114 ft. high.

Packing and Loading From the silos the cement is transferred to a 12-spout packing machine which automatically fills and weighs 2,000 bags per hour. From the packing machine the bags are transported on a conveyor belt either to trucks or on board ships.

The equipment used to load ships is of a rather new design. The bags are transported from the packing machine by a 275-yd. conveyor belt out to the quay, to the specially designed loading equipment. This setup is a crane, movable alongside the ship for a distance up to 150 yd., carrying a conveyor belt system. By means of this conveyor belt system the bags are transported into the hold of the ship, where they are delivered to a rotating table. From this point they are taken by hand and stowed. In this way about 80 tons of cement are stowed per hour by merely 12 workers, including packers.

Dust Removal At points where the cement plant lies close to houses, everything possible is done to prevent cement dust from spreading to the neighborhood.

Very little dust is formed, compared with the incidence in some other factories, or only 4 percent compared with the clinker production. This dust from the kiln is disposed of by means of a double electric filter, which retains 98.5 percent of the dust. There is therefore practically no dust escaping from the chimney. An electric filter (electro-filter) attached to the mill absorbs 99 percent of dust from the air which passes through it; and the packing machine is also fitted with a sack-filter. Dust in the air which quenches the clinker in the cooler is disposed of by means of a cyclone.

The neighborhood of the Akranes plant is therefore not troubled by any cement dust. This had been a source of worry to many people before the plant opened.

Power Supply Electricity for the plant is supplied by two power plants which are connected: the Andakils River hydroelectric power plant in Borgarfjordur, about 25 miles from Akranes, and the Sog hydroelectric power plant. The factory receives electricity at 6,000 voltage, which is used for the mill motors; elsewhere 380 or 220 voltage is used. The plant has its own transformers.

All machinery and equipment was designed and delivered by F. L. Smidth & Co., Ltd., Copenhagen, with the exception of the drag-scraper which was supplied by Sauerman Bros., Chicago, Ill.

A VIEW of the specially designed crane and conveyor system with which bagged cement is loaded into ship holds. About 80 t.p.h. can be handled at this installation.

TYPES OF PRODUCTS

Two kinds of cement are now produced at Akranes—Type I and Type III, in accordance with A.S.T.M. specifications. Annual capacity is about 100,000 tons of these two kinds of cement combined. Production has somewhat exceeded consumption of cement in Iceland recently; so about 20,000 or 30,000 tons could be sold for other purposes. The cement has been proved of good quality.

Before long, still another kind of cement — pozzolan — will be produced. In the last few years various Icelandic rocks have been examined for the purpose of discovering their pozzolan properties. Many of them possess these properties due to the presence of many igneous rocks in

(*Concluded on page* 91)

Tested Tire Tips For Earthmovers and Heavy Trucks

pointers on prolonging tire life
suggestions on storage
underinflation and overinflation

MODERN earthmovers are equipped with huge tires that have boosted haul road speeds and cut the costs of off-the-road operations. Such savings, however, can be lost unless a few common-sense rules are followed to prolong tire life. This view was expressed by spokesmen of International Harvester Co. Construction Equipment Div. Service Dept.

Tire Inspection The key to such prolongation is a daily tire inspection, with emphasis on the following points:

● 1. Inflation should be inspected with a low-pressure gauge, marked in 1-lb. gradations, *in the mornings,* when the tires are cool. If a tire is found to be considerably underinflated, the vehicle should not be operated until the cause of the air loss is located and the leak repaired.

Underinflation causes rapid wear on the outer edges of the tread and excessive flexing, resulting in the building up of internal heat. Blowouts frequently result. Continued underinflation results in radial cracks such as those in the accompanying illustration.

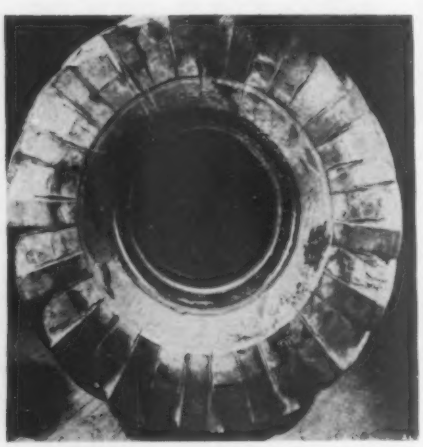
Overinflation causes rapid wear at the center of the tread and often leads to sidewall breaks, the result of impact loads.

Should pressure build up during the day, it is advisable not to bleed the tires, as the added pressure automatically compensates for the additional heat by preventing sidewall flexing; this would generate more internal heat.

● 2. Inspection should be made for cuts which penetrate to the cord body. If these are not repaired immediately, they will spread quickly. Shallow cuts should be skived with a knife or with a bullnose rasp to prevent small stones from working through the cords.

● 3. Rims and flanges should be checked for damage. If the tires are dismounted for repair, it is well to clean and paint the rims to make mounting easier and to prevent rust damage. All oil or grease found on rim assemblies should be removed, as this material causes rubber to deteriorate rapidly. Therefore, it makes good sense not to park a vehicle overnight on a greasy or oily spot.

● 4. Caked mud and rocks should be removed from tires, and especially from between rear-mounted duals. If uneven tire wear is detected, the cause should be located and corrected as soon as possible.



Left: These radial cracks were caused by continued underinflation.

Right: An example of a blowout caused by continued overinflation.

Left: The battered appearance of this tire shows deterioration caused by oil and/or grease.

Right: This sectional view of a tire shows a casing break caused by overloading.

Mismatched Tires Mismatched tires on dual assemblies result in unequal load distribution. The new, larger tire wears rapidly, and the smaller tire usually scuffs severely.

The situation can be avoided by mounting tires on the same diameter on dual assemblies. If it is necessary to use a slightly smaller tire, it should be placed in the inside position.

Condition of Haul Road Tire life and job costs are affected greatly by conditions of haul roads. Roads that are well designed and sufficiently maintained may double or even triple haul speeds, thereby drastically lowering dirt-moving costs.

Steep grades and sharp turns mean slippage, which shortens tire life. Loose or embedded rocks increase the possibility of damaging cuts and jolts. Shocks and impacts resulting in down time are at the minimum on smooth haul roads.

Tire Storage Proper storage of tires is most important. Tires and tubes stored under the wrong conditions can age more quickly than those in daily service. Light, heat, oil, dust, dirt, and moving air all are responsible for deterioration.

The following four steps are important:

(a) Store tires and tubes in a cool, dry, dark area that is protected from the wind. (Cover them with a tarpaulin, if such an area is not available.)

(b) Do not store tires in the same area with gasoline or lubricants. Lubricant vapors can be absorbed by the rubber, causing rapid deterioration.

(c) Pile tires on a wooden foundation to keep them off dirty, oily floors. Keep the same sizes together, and never place a larger tire on a smaller one.

(d) Tires stored outside always should be protected with a waterproof covering. It is essential to keep water and oil from the inside of the tire casing. A sure method of preventing such water and/or oil contact is to mount the tire on a wheel, with air pressure reduced 50 percent. The entire assembly should then be covered with a tarpaulin.

When to Purchase Tires There is a best time to buy tires—in the fall or early winter—for longer tire life. The cooler the tire runs, the longer it will last.

Tires that have run all winter have thinner treads than new tires and, therefore, run cooler. New tires with heavier treads run hotter, wearing down approximately 30 percent faster.

Overloading A careful watch to detect and avoid overloading is a must. A 20 percent overload, for example, drops expected tire life by 30 percent. The ratio continues, until at 100 percent overload only 25 percent of normal tire life can be expected.

Iceland's Cement Industry

(*Continued from page* 89.)

Iceland. But none of them possesses pozzolan properties to a larger degree than the tuff which accompanies the shell sand dredged from Faxa Bay; and the tuff will therefore be used for the production of pozzolan cement next year.

In addition to the three types of cement mentioned, lime fertilizer is produced. For this purpose the lime concentrate produced by the flotation process is used. It is most suitable in this connection as the grain size is less than 0.02 in. and has a lime content of 90 to 95 percent. The lime concentrate has only to be dried, and the plant can produce up to 20,000 tons per year. There is a pressing need for the use of lime fertilizer in Icelandic soil as in many places it is too acid for vegetation to grow. Moreover, the nitrogen fertilizer chiefly used (ammonium nitrate) is such that it acidifies the soil somewhat, necessitating a neutralizing agent.

Thus this plant not only helps the people of Iceland in their attempts to modernize the construction industry of their country through the production of cement, but also to increase the growth of the vegetation.

• Disaster

Processing flow through the new mill begins with the feed dump hopper for incoming trucks. Ore from both the company's quarries and also purchased material is weighed before dumping to keep a record of total mill feed, and also of quarried and purchased quantities.

Leads to Modern Feldspar Operation

ANOTHER ON THE SPOT report

TWO years ago International Minerals & Chemical Corporation turned a disaster into the best thing that ever happened to its Consolidated Feldspar Department operation at Custer, S. D.

In midsummer, 1958, the original 20-year-old wooden mill structure was struck by lightning and leveled by the resultant fire. Virtually every primary component of processing equipment was reduced to scrap. However, just 88 days after the fire, the first bulk shipment was made from a completely new replacement operation.

Literally having to rebuild from the ground up, the management took full advantage of the opportunity to wrap up greater production efficiency, higher capacity, and improved customer service in one package. Continuance of top-grade

By BUREN C. HEROD

feldspar production was a natural objective. Complementing and augmenting that goal was a new plant design by company engineers, that raised milling capacity by approximately 33 percent—while incorporating fewer mills.

As compared with the 6-t.p.h. rate of the old plant, based on fine-grind capacity from five smaller mills, the new operation can deliver 8 t.p.h. of fine and relatively coarser grades more efficiently from three mills in flexible milling circuits. This increased production, combined with efficient product handling, distribution, and loading systems—all housed in a modern concrete and steel, fireproof structure—assures even better customer service.

Primary products consist of 325-mesh high-potash feldspar for high-tension porcelain insulators and ceramic manufacturing; 200-mesh spar for other ceramics production, including floor and wall tile, and sanitary ware; 140-mesh products for vitreous enamel; and 40-mesh spar for glass manufacture. About 55 percent is shipped in bulk and the remainder in bags. The greatest tonnage is shipped into Midwestern ceramic and glass producing areas.

To supply the new mill, several quarries are operated by the company. The largest, east of Custer, is known as the Shamrock. Some cobbing is done at the quarry on material from the Shamrock. In addition to ore mined by International Minerals, spar is also purchased from independent miners. Both the company's own ore and purchased material are weighed over a Fairbanks-Morse truck scale at the mill to keep a record of total mill feed, as well as quarried and purchased quantities.

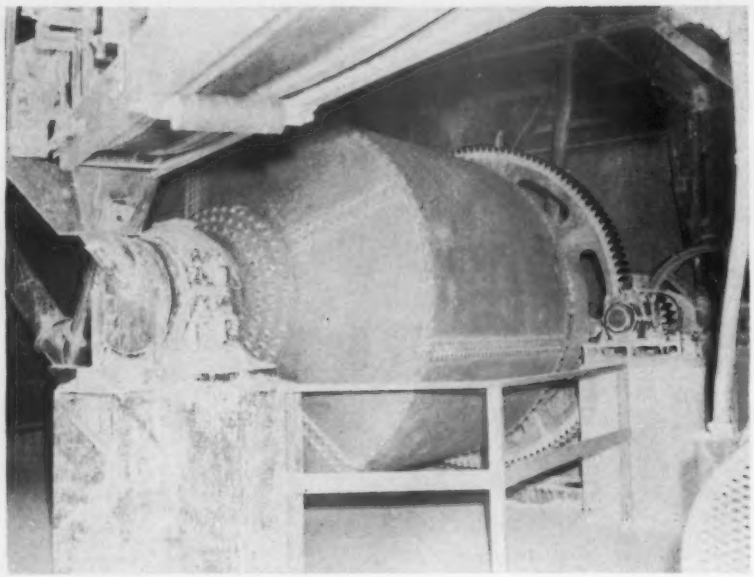
In the larger quarry, the Sham-

Higher capacity, efficiency, improved service rise from ashes of old plant

Above: Just 88 days after the original Custer, S. D., mill of International Minerals & Chemical Corporation's Consolidated Feldspar Department was destroyed by fire, the first bulk shipment was made from this completely new facility. The modern fireproof mill houses a flow line with 33 percent greater milling capacity. In the left foreground are the concrete finished product storage silos and rail-loading facilities.

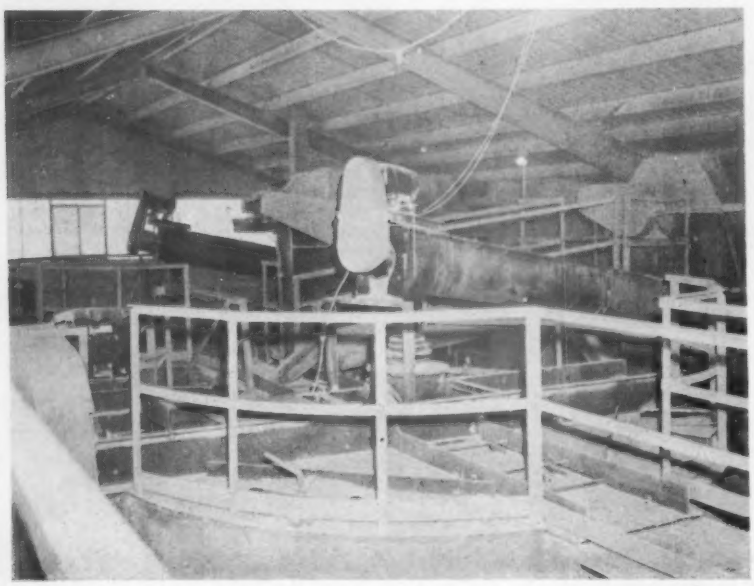
Above: At the cobbing bins, fines are first removed from the quarry-run material through a bar grizzly, and the remaining large material is hand-sorted between mill feed and rejects.

Right: A view in the Shamrock, the largest of the company quarries. The ore occurs in an extensive pegmatite dike.



One of the three mills in the new milling circuits. These units together provide one-third more fine-grind capacity than was formerly available in five smaller mills, and operate in more flexible circuits.

Below: In each circuit, mill discharge is raised in a bucket elevator to discharge into a 14-ft. separator. The tops of two of the separators, and the screws transferring the material from bucket elevators, are seen here.



rock, the ore occurs in an extensive pegmatite dike. The face was opened into the side of a hill, and core drilling has revealed good quality material to a depth of at least 85 ft. Horizontal 2½-in. blastholes are sunk with a Gardner-Denver wagon drill to a depth of 24 ft. on 6-ft. centers. A shot may involve 24 holes, sometimes more, and these are charged with Atlas or DuPont 2x12 cartridges with detonation on millisecond delay. A good shot will bring down between 4,000 and 5,000 tons of ore. Secondary breakage is handled by dropballing, as needed.

The ore is loaded out with a ½-cu. yd. Quickway 125B shovel, and hauled to the cobbing bins (at Shamrock) in Chevrolet trucks. Identical equipment is used in quarrying at the White Elephant site.

At the cobbing bins the ore is dumped over a stationary sloped bar grizzly which removes fines that are sold as gravel or fill. Large fragments pass through cobbing chutes preceding a group of cobbing tables. Here the material unacceptable for mill feed is dropped into reject bins, and the best ore into other underlying bins. The latter is then trucked to the mill site.

In the extensive quality control program, described more fully later, the pit-run material is routinely subjected to chemical analysis. In addition, should sections of the quarry face appear of doubtful quality, these are put through special checks. Both quarried and purchased spar for mill feed must come within the following representative analysis:

SiO_2	68.5 (± .5) %
Al_2O_3	17.5 (± .3)
Fe_2O_3	0.07 (0.09 max.)
CaO	0.1
MgO	trace
Na_2O	2.9 (± .3)
K_2O	10.6 (± .3)

For two-shift operation of the mill, about 135 tons of ore are trucked in daily. Three-shift operation boosts this figure to 175 tons. At the mill site, the feed may be dumped directly into the mill feed hopper, or onto a surge pile which is maintained at about 7,000 tons.

Each 10-ton load discharged into the mill feed hopper is transferred on a 24-in. by 12-ft. Universal feeder to a following 18 x 30 Universal jaw crusher. The latter, driven by a 50-hp. motor, reduces the feed through a 1½-in. setting, and discharges onto a belt supplying a Link-Belt bucket elevator.

The crusher-run is elevated to the feed box of the secondary crusher —a 3-ft., 75-hp. Symons cone. Products of this secondary reduction, with a top size of ½ in., are in turn raised in a bucket elevator that feeds an 18-in. horizontal belt conveyor, above a pair of 180-ton capacity silos. The distributing belt delivers mill feed into both silos.

Draw from each storage, at a present rate established for the particular mesh size being ground, is

initiated on Syntron feeders. For example, if two of the mills are operating on a 325-mesh grind, the feeders are regulated to deliver the desired rate of material to those units. The third mill will be given the return from the separators in the other two milling circuits, plus makeup feed from a silo, for production of 40-mesh products.

Of the three mills now installed in the new plant, one is an 8- by 12-ft. Kohler mill, driven by a 150-ft. Allis-Chalmers motor; the second is a 4- by 8-ft. Hardinge unit, and has a 125-hp. A-C drive.

The third mill is an 8- by 10-ft. Patterson, also equipped with a 125-hp. A-C motor. All mills are lined with jasper blocks, and are charged with Belgian grinding pebbles. About 14 tons of pebbles are required for the largest mill, and 12 tons each in the other two. In total, about 1000 lb. of makeup pebbles are charged daily.

Each milling circuit is comprised of a mill, an elevator, and a 14-ft. Gayco (Universal) separator, which is fed mill discharge from the bucket elevator in the circuit *via* screw conveyor. The Kohler mill, which is used for most of the 325-mesh production, always operates in closed circuit.

In the other two milling circuits, designed flexibility permits simultaneous production of both finer and coarser mesh products. The latter is accomplished by returning the oversize from each separator in the particular circuit to the respective mill, or delivering this material to an elevator serving the smaller mills.

If the common elevator is used, the oversize from the two separators is discharged on a 4- by 5-ft. Tyler Hum-mer screen in producing 40-mesh products.

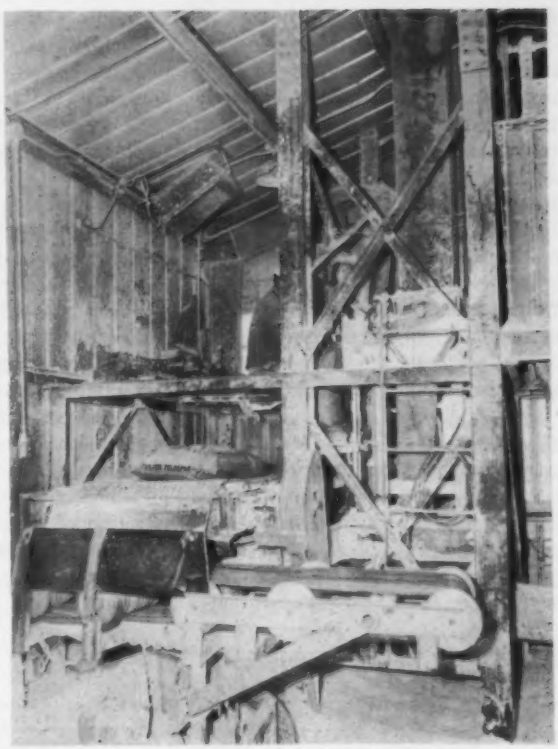
Fractions from the separators and from the Hum-mer screen are transferred *via* screws to bucket elevators that discharge into the appropriate storage, which is comprised of five identical concrete silos. Four of these hold about 350 tons of the finer-ground products, and the other accommodates 400 tons of 40-mesh feldspar.

In handling finished products from these silos, provision has been made for direct bulk loading into rail equipment, or for transfer to the bagging department. The finer fractions destined for bagging are drawn into a screw conveyor system for transfer to the packaging shed. The 40-mesh product is drawn into a bucket elevator. From either flow, the products are discharged into the bins ahead of a two-spout Black Products bagger. Filled bags are moved into the cars on the adjoining rail-loading dock on a Power-Curve conveyor.

Dust collection from this depart-

(*Continued on page* 124.)

At the left are the lower sections of the three separators, and at the right the totally enclosed mill control room on the second floor of the mill.



In addition to bulk rail loading, this packing installation was provided for product bagging. The conveyor, foreground, carries bags to cars by the loading dock.

power factor correction

By H. A. JONES
British Insulated Callender's Cables Ltd.

PART II

Location of Capacitor Equipment

TO take full advantage of any scheme for power factor correction, each motor, furnace, welder, etc., should, with an associated capacitor, operate at a power factor approaching unity. This ensures minimum loading conditions on all sections of the distribution system, although, of course, due to diversity of operation of individual loads, this ideal is not always economical.

Generally, however, when the total correction required has been ascertained, it is advantageous to apply individual correction to motors which are constantly in operation or, which, in the case of kVA maximum demand tariffs, are certain to be in operation at the time of maximum demand. The balance required should then be distributed in such a manner that units connected to distribution centers, cater for the individually uncorrected loads fed therefrom, preferably automatically controlled.

Each case naturally requires individual consideration, taking into account the terms of the contract between the supply authority and the consumer, the method of metering adopted, and the loading of the consumer's system layout.

Motor Correction

In addition to the technical considerations previously mentioned, *i.e.*, reduced current loading on the distribution system, with consequent improvement in voltage regulation, individual correction of motors is, generally speaking, more economical. No additional switchgear or control relays are required, as the correction is connected directly across the motor terminals and therefore switched with the load by the motor starter, resulting in complete automatic control.

The rating of the capacitor connected to an individual motor should be such that a leading power factor is not obtained under any loading condition that may be imposed upon the motor. Consequently, it will be found that if the no-load magnetizing kVAr of the motor is exactly neutralized by the capacitor, a power factor in excess of 0.98 will usually be obtained on all loads up to 100 percent loading on the motor in question. Under these conditions, it will be apparent that at whatever loading conditions the motor is operated, the demand on the system is at the most economical value.

In Table 1 characteristics of ten motors are given based on manufacturers' test-bed figures, together with the improvement in power factor effected under various loads by the recommended rating of capacitor.

If no actual characteristics are available, it is safe to estimate on average characteristics for motors up to 100 hp. Tables 2 to 4 give the maximum capacitor ratings for various synchronous speeds (at 50 cycles per second) for slip ring motors and squirrel cage direct-on (across the line) and star-delta-started motors.

It is of importance that the maximum recommended rating of capacitor for a particular motor is not exceeded; otherwise, on opening the motor starter, the motor-capacitor combination may act as an induction generator and cause dangerous over-voltage generation,

Table 1—Effect on Power Factor of Installing Capacitors Equal to the Magnetizing kVAr of Motors

Motor hp.	Speed (r.p.m.)	Efficiency Full load	Efficiency ¾ load	Efficiency ½ load	No-Load kVAr (i.e., Capacitor Rating)	Power Factor (a) Without Correction Full load	(a) Without Correction ¾ load	(a) Without Correction ½ load	(b) With Correction Full load	(b) With Correction ¾ load	(b) With Correction ½ load
20	580	87%	87%	86%	10	0.78	0.71	0.595	0.977	0.978	0.982
50	580	89%	90%	89%	22	0.82	0.75	0.635	0.985	0.986	0.986
75	580	90%	91%	90%	23	0.86	0.81	0.725	0.976	0.976	0.979
100	580	91%	91.5%	91%	30	0.855	0.81	0.72	0.972	0.974	0.974
200	580	93%	93.5%	93%	50	0.885	0.85	0.77	0.978	0.980	0.980
20	720	87%	87%	86%	8	0.82	0.76	0.66	0.974	0.974	0.976
40	720	89%	89%	88%	12	0.86	0.815	0.73	0.973	0.974	0.976
80	720	91%	91.5%	91%	24	0.87	0.825	0.735	0.980	0.982	0.982
120	720	92%	92%	91%	35	0.88	0.84	0.75	0.984	0.986	0.986
200	720	93%	93.5%	93%	55	0.89	0.85	0.765	0.986	0.987	0.988

which may damage both capacitor and motor. Consequently, care should always be taken when a capacitor is moved from one motor to another, due to production changes, to ensure that such difficulties do not arise.

It is, of course, preferable for too small a rating of a capacitor to be connected to a particular motor in such circumstances; this will merely result in somewhat reduced power factor improvement on that particular section of the system. If this cannot be arranged, and the alteration is of a permanent nature, it is generally possible for the rating of the capacitor to be reduced to the required amount by disconnecting the appropriate number of elements in each phase. It is advisable to do this in consultation with the capacitor manufacturer.

Due to the fact that the introduction of suitable correction results in a lower load current for a particular operation, the overload settings on the motor starter should be suitably reduced in order to obtain the same degree of protection.

Group Correction by Capacitors

It is not often possible to locate all the required amount of correction on individual motors. In fact, due to the diversity of the load, it may be possible to place only a relatively small percentage of the total requirements in this manner. In such cases the best approach is to connect a capacitor to a distribution board feeding a group of motors, the rating of the capacitor being such that the over-all power factor of the load is improved to 0.9/0.95 lag—depending on the particular tariff in force.

Such capacitors must be provided with means for switching it out of circuit (automatically or manually) when load conditions do not warrant its remaining in circuit.

In some cases it is not advisable to connect correction to a distribution board, as this would result in a relatively large number of small capacitors being installed, which would prove expensive. Instead, the amount of correction which cannot be housed on individual motors is connected to the main bus-bars, in one or more units. Such units have to be again fitted with control gear.

Manual Control of Capacitors

For many years all line capacitors were manually controlled, the smaller ratings up to, say, 30/40 kVAr by air-break switch fuses, and larger ratings by oil circuit breakers. This method of control inevitably resulted in capacitors being left switched into circuit under both light and no-load conditions. This resulted in unstable system conditions.

Consequently, many supply authorities insist that any correction in the form of capacitors shall be controlled in such a manner that sustained leading power factors do not occur. With manual control, it is in such cases necessary to detail personnel to switch the capacitors out of commission at the end of the day or shift, and to reconnect prior to the commencement of operations on the next day or shift. With a month's or year's saving at stake, this method leaves a great deal to be desired; consequently, automatic control has very largely superseded manual control in such cases.

Table 2—Maximum Capacitor kVAr Ratings for Slip Ring Motors

Motor hp.	470 r.p.m.	560 r.p.m.	750 r.p.m.	1000 r.p.m.	1500 r.p.m.
5	—	—	3.6	2.9	2.5
7½	—	—	4.6	4	3.4
10	—	—	5.6	4.9	4.4
15	—	8.8	7.8	6.2	5.7
25	15.3	14.2	12.0	9.6	7
30	18.6	15.8	12.2	11	8.7
40	20.5	19.6	15	14.4	11.6
50	24.3	24	18.4	16.7	13.8
75	32.2	29.3	24.7	23.1	—
100	41.6	38.5	31.9	—	—

Table 3—Maximum Capacitor kVAr Rating for Direct-on (Across-the-Line Start) Squirrel Cage Motors

Motor hp.	470 r.p.m.	560 r.p.m.	750 r.p.m.	1000 r.p.m.	1500 r.p.m.
5	—	—	3.3	2.4	2.1
7½	—	—	4.6	3.6	3.1
10	—	6.4	5.9	4.4	3.8
15	—	9.1	7.3	6	4.9
25	15.3	14.2	10.7	8.4	7.3
30	18.6	15.8	12.8	10.1	8
40	20.5	19.6	15	13.3	10.7
50	24.1	23.9	18.3	16.6	13.4

Table 4—Maximum Capacitor kVAr Ratings for Star-Delta-Started Squirrel Cage Motors

Motor hp.	470 r.p.m.	560 r.p.m.	750 r.p.m.	1000 r.p.m.	1500 r.p.m.
5	—	—	3	2.1	1.9
7½	—	—	4.1	3.3	2.8
10	—	5.3	5.3	3.9	3.4
15	—	8.2	6.5	5.4	4.4
25	13.7	12.8	9.6	7.5	6.5
30	16.7	14.2	11.5	9.1	7.2
40	18.4	17.6	13.5	12	9.6
50	21.7	21.5	16.5	14.9	12

Automatic Control of Capacitors

Automatic control of capacitor equipment which is connected directly to the main bus-bars or a distribution board through a contactor is generally effected by either a current or reactive relay. Generally the latter form of relay is most suitable, as the former cannot discriminate between apparent and load current, and under these circumstances, capacitor equipment can be brought into circuit unnecessarily.

The reactive current relay ensures that the kVAr taken from the supply is maintained within predetermined limits, and thus results in a high power factor being achieved under all conditions, irrespective of the load. This form of relay can be applied in two ways:

1. Single-stage control, in which case a separate relay controls each capacitor.

2. Multistage control, when a centrally located relay controls capacitors, either dispersed in the factory or in groups through a multistep controller, switching them in a predetermined order.

Except where the number of capacitors to be controlled is large, the single-stage relay is to be preferred as the switching of each capacitor is closely related to the loading conditions on the circuit to which it is con-

nected. This form of equipment is extremely flexible in operation; it occupies the minimum of floor space; and as it is located adjacent to its associated capacitor, it simplifies the control wiring.

On the other hand, the multistage method of automatic control has undoubted advantages in certain installations requiring a large number of capacitors, and also in large installations on an average power factor tariff in conjunction with single-stage relays. In the latter case it ensures that the minimum number of wattless units are consumed at light load periods—when the single-stage operated units have switched out the capacitors which they control.

Single-Stage Control Equipment

The single-stage equipment consists of an induction-type reactive VA relay enclosed in a glass-fronted dust-proof case, together with an intermediate relay contactor and auxiliaries installed on a wall-mounted steel panel. On the panel a selector switch is mounted to permit automatic or manual operation to be effected as required.

When the power factor of the circuit to which the relay is connected is lower than unity, a torque is exerted on the relay disc, which then rotates in a clockwise or anticlockwise direction, depending on whether the power factor is leading or lagging. A contact arm, integral with the disc, after limited travel from the central or unity power factor positions, makes contact with fixed contacts at predetermined values of lagging or leading kVAr.

In the event the circuit power factor is lagging, and the contact arm is closing with the fixed "lag" contact, the relay contactor is energized; consequently, the capacitor contactor closes, and the capacitor is brought into circuit. In the meantime, the relay contactor operating coil circuit is maintained independently of the relay contacts.

As the load on the circuit falls, the capacitor may cause a leading power factor, causing the contact arm to rotate with the disc in the opposite direction. When the rotation is sufficient that the arm closes with the "lead" contact, the relay contactor coil is short-circuited, thus opening both relay and capacitor contactors, and switching out the capacitor.

Multistage Control Equipment

Multistage equipment is generally supplied in the form of a cubicle suitable for floor mounting, in which is accommodated the reactive VA relay and a constant-speed reversing motor. The latter operates mercury switches, which, in turn, control the capacitor contactors. On the front of the cubicle, selector switches and indicator lamps for each available capacitor circuit are mounted. These selector switches can be set to "Automatic," "On," or "Off," permitting automatic or manual control of the capacitors and disconnection of a particular capacitor as required.

Operation of the relay is similar to the single-stage equipment, but in this case when the contact arm makes with the "Lag" contact, the motor is energized and rotates the camshaft, closing the mercury switches progressively until such time that the capacitance in circuit is sufficient to restore the contact arm to a more central position, or alternatively, until such time that all available capacitors are in circuit, when a limit switch prevents overdrive of the camshaft.

When conditions are such that the contact arm makes with the "lead" contact, the motor operates in the reverse direction and progressively opens the mercury switches until correction appropriate to the load has been provided.

Electricity Supply Tariffs

There are several tariffs in force which enable industrial consumers to reduce the cost of the electricity purchased, by improving the power factor of their load. The most common is a tariff in which a user pays a fixed charge per month, quarter, or year for each kVA of maximum demand recorded. The supply authority installs a maximum demand meter which indicates the highest kVA load recorded during any 30-minute period throughout the period concerned. In addition, a charge is made for each unit consumed, and generally a coal clause is inserted.

This type of tariff offers an extremely attractive proposition to those contemplating power factor improvement. For example, a consumer operates on a kVA maximum demand tariff of £5 per kVA per annum, and the load is 120 kVA at .75 power factor. In order to improve the power factor to .97, it would be necessary to install 57 kVAr of corrective equipment.

Actual or kW loading $= 120 \times .75 = 90$.

Hence:

kVA maximum demand at .97 power factor $= \frac{90}{.97} = 93$.

kVA charge without capacitors—120 $\times$ £5—£600 per annum.

kVA charge with capacitors—93 $\times$ £5—£465 per annum.

Annual saving = £135.

This would represent a return of approximately 75 percent of the capital outlay on capacitor equipment costing approximately £185.

It is often surmised that with a fairly high power factor, say, 0.9, it would not be a good financial proposition to install equipment to raise the power factor to a higher figure. This is far from being the case. Although the percentage return on the capital involved is lower, it is sufficient to be attractive.

As an example, if the consumer referred to above had operated initially at 0.9 power factor, it would have required 21 KVAr of capacitor equipment to improve the power factor of the 90 kW load to .97.

kVA max. demand at 0.9 power factor $= \frac{90}{0.9} = 100$

kVA max. demand at .97 power factor $= \frac{90}{.97} = 93$

Thus, a reduction of 7 kVA would be effected, resulting in a saving of 7 $\times$ £5, *i.e.*, £35 per annum.

The 21 kVAr of corrective equipment would cost approximately £65, thus showing a return of approximately 55 percent on the capital cost.

It is, therefore, always advisable to ensure that once

compensating equipment is installed, due consideration is given to the effect of additional motor load being added, in order that the power factor is maintained at an economically high level. Where possible, it is a good policy to install the additional capacitors required at the time the motors are added to the load—thus taking full advantage of the improved conditions.

Other tariffs offering an inducement to improve the power factor are either variations of the kVA maximum demand tariff, or include a rebate and penalty for power factors above or below a prescribed figure.

In some cases this depends on the power factor at peak load, but more generally on the average power factor during the month or quarter for which the account is rendered.

A common tariff of this type charges the consumer at a fixed price for each kW of maximum demand, with unit and coal charges, with a bonus of ½ percent for every .01 by which the average power factor is in excess of 0.8, and 0.5 percent for each .01 below 0.8.

If a consumer operating on the above type of tariff had a load of 150 kW with an average power factor of 0.7, it would be possible for him to improve the average power factor to .97 by the installation of 115 kVAr of capacitor equipment costing £365. The following gives an indication of the saving available:

Annual cost *before* installing capacitors	£
Basic charge (at 0.8 power factor)	1,865
Penalty of 5 percent for 0.7 power factor	93
	£1,958

Annual cost *after* installing capacitor:	£
Basic charge (at 0.8 power factor)	1,865
Rebate of 8½ percent for .97 power factor	158
	£1,707

Annual saving = £251

This represents a return of approximately 70 percent on the capital outlay necessary in this case.

The relationship between the cost of the compensating equipment and the saving depends on the tariff charges, the load factor, the degree of power factor improvement required, and also the method of metering. Consequently, the ratio of saving effected to the initial cost varies widely for individual cases, but generally it is found that if the tariff is similar to the above, an attractive investment is available.

Fuel Economy

Power factor improvement to a concern generating alternating current may be the means of reducing fuel consumption. In some cases on record it has been necessary to run an extra generator merely to supply wattless current. Improved power factor conditions have made it no longer necessary to run this machine, and, moreover, have also made it possible to supply additional load to the other generators without overloading them. This naturally effects an economy in fuel, and the additional stand-by generator capacity available is an important item.

In an actual example, the load was of the order of 840 kW at 0.6 power factor, *i.e.*, 1,400 kVA. Three generator sets were available, each rated at 0.8 power factor—one of 1,000 kW (1,250 kVA), and two of 500 kW (625 kVA).

Because of the low power factor, the load was beyond the capacity of the 1,000 kW set, and it was necessary to run one of the 500 kW sets in addition to the 1,000 kW set. It was decided to install 610 kVAr of capacitor equipment to improve the power factor to .85 and so reduce the load to 990 kVA. This enabled the large set to cope with the load, resulting in (1) greatly reduced fuel charges, (2) availability of 100 percent stand-by generator capacity, and (3) the possibility of connecting an additional 260 kVA of load without overloading the 1,000 kW set.

Some firms which generate their own power also take a supply from the public utility. Generally, this is done when the total load is greater than the capacity of their own generators. Power factor improvement may permit the generator to deal with the total load, or at any rate to reduce the amount of electricity which is purchased. Such economies very soon pay for the cost of the corrective equipment involved; and if indirect economies can also be made, the proposition is attractive.

Construction of Capacitors

Capacitors for medium-voltage operation have for many years been "tailor-made" to meet individual requirements, which necessitated the production of a large number of ratings, each accommodated in a single container. Consequently there were no real standards, and mass production methods could not be employed. The resultant capacitors were relatively bulky, the container was unnecessarily robust, and the ratio of active to over-all volume was low.

Some years ago a unit capacitor was developed which had a few standard ratings. Such capacitors were complete in themselves, but were capable of assembly on site to give multiples of the unit ratings. Mass production was possible, and the resultant improved assembly techniques and lighter containers led to a reduction in both volume and weight. The variation in available ratings, however, in steps of the original ratings, did not enable the user to match the capacitor to individual requirements accurately or economically.

Recently a great advance in the technique of capacitor manufacture took place with the introduction of a design which is now commonly referred to as "MW" construction. This combines the merits of both "tailor-made" and unit capacitors.

Manufactured basically in the unit principle, it makes a wide and closely graded number of ratings available. Three primary unit ratings in steps of about 1 kVAr which can be assembled into composite units by the manufacturer, make almost any desired rating in steps of about 1 kVAr available.

"MW" capacitors in compact assemblies occupying minimum floor space or really suitable for wall or stanchion mounting are a great improvement on the types previously available. It is possible to combine contactor gear and automatic control relays into a composite assembly, which simplifies site wiring and still

further reduces the necessary floor space.

Each primary unit consists of the required number of capacitor elements which are composed of two metal foils interleaved with a number of high-quality tissue papers and wound into a common roll by means of a specially designed winding machine. The voltage at which the element is to operate governs the number and thickness of the tissue papers between the two foils. During winding, a number of foil connection tabs making contact with each foil are inserted at regular intervals. After bunching, connecting wires are soldered to these tabs.

The elements, after winding, are pack-assembled to form one phase of a capacitor and then flash tested. All elements are parallel-connected to bus-wires. Three such packs are mechanically joined, and the necessary connections are made to connect the packs in delta. The complete assembly is put into a tight-fitting container.

Prior to impregnation, it is essential that all moisture is drawn from the capacitor elements. This is accomplished by placing the elements in steam-jacketed steel pans capable of being hermetically sealed. The withdrawn moisture is exhausted by vacuum pumps, and when the drying process is complete, the impregnant is pumped into the pans and absorbed by the elements.

After this process the capacitors are hermetically sealed and electrically tested, painted, and prepared for final assembly. Such capacitors are then ready for the inception of a terminal cover, or for mounting into the assembly with other primary units. Wall or floor fixing brackets are then fitted on the smaller ratings of up to 10 kVAr; for larger ratings, base brackets are generally preferred.

Each primary capacitor is fitted with a continuously rated low-loss discharge assembly, which ensures that the capacitor is discharged from peak alternating voltage to a voltage not exceeding 50 v. measured at the capacitor terminals one minute after disconnection from the supply.

Except in the case of capacitors for direct connection to star-delta-started squirrel cage induction motors, all capacitors for power factor correction are delta-connected and brought out to three porcelain-insulated terminals. In the case of capacitors for star-delta-started motors, six terminals are brought out in order that each phase of the capacitor can be connected across the separate motor windings. Single-phase and two-phase units are also available for standard connections. In all cases, the terminal covers are suitable for the accommodation of conduit entry, although special arrangements can be made for the fitting of cable boxes, if desired.

Conclusion

The economics of power factor correction are rapidly becoming more important, both from a national and an individual consumer's point of view. It is important to take full advantage of the economics available, not only from tariff considerations—but from an internal distribution loading aspect. It is often found that the reduction in loading results not only in an appreciable reduction in losses, but that a considerable reduction in capital expenditure is effected when extensions to the electrical load are required. Once the power factor of an installation has been corrected, any subsequent additions to the load should be individually corrected when installed; or group correction should be adopted as soon as possible after installation.

16th Annual M.L.P.A. Meeting Draws Record Attendance

THE 16th annual convention of the Missouri Limestone Producers Association, held December 8-9 at the Governor Hotel, Jefferson City, was attended by more than 300 association members and producer guests from Iowa and Kansas, a record high registration.

Elected to the group's top office was Elmer L. Aussieker, Auxvasse Stone and Gravel Company, Auxvasse, Mo. He succeeds the retiring president, Adolph Adrian, Adrian Materials Company, Jefferson City.

Other officers elected were R. W. Cullor, Cullor Limestone Company, Fort Scott, vice-president; and John Griesemer, Griesemer Stone Company, Springfield, secretary-treasurer. N. A. (Bud) McDonald was re-elected executive manager.

R. W. Cullor, center, Cullor Limestone Company, Fort Scott, was elected president of the association.

New members of the board of directors are E. W. Hillenkamp, O'Fallon Quarry and Supply Company, O'Fallon; and Robert Trager, Trager Quarries, Inc., Chillicothe. Mr. Adrian, former president of the group, was renamed to a three-year term. Retiring officers were Charles Krause Jr., Columbia Quarry Company, St. Louis; and Charles Hayes, L. W. Hayes, Inc., Kansas City.

Top item on the group's discussion agenda included the matter of legislation concerning published tariffs on dump trucks hauling bulk commodities; the enactment of legislation authorizing the state department of revenue to permit percentage depletion on crushed stone as a deduction for state tax purposes, an objective on which the board had worked vigorously; and operating problems.

BASIC FACTORS IN

Employee Benefit Programs

This is the second in our continuing series of articles on employee benefit programs, prepared with the co-operation and assistance of Donald Shepherd and Company, Inc., benefit plans consultant to the National Sand and Gravel Association, National Ready Mixed Concrete Association, National Industrial Sand Association, and National Concrete Masonry Association. (See *Basic Factors in Employee Benefit Programs*, p. 142, January, 1961, PIT and QUARRY.

This article, devoted to programs covering situations involving long-term disability, makes reference to the Disability Salary Replacement Plan sponsored by the above associations for the benefit of their respective member-companies. However, we feel that whether or not you are a member of an industry association, it will prove to be of interest to you.—The Editors

THE HAZARD OF ECONOMIC DEATH—

Long-Term Disability

AFTER reaching maturity and assuming the usual responsibilities which accompany it, each one of us can and should take certain steps which will tend to offset the three serious hazards with which we are confronted: (1) *not living long enough* (an early death); (2) *living too long* (living well beyond our productive years, and thus facing economic hardship during our old age); (3) *living through a period of long-term disability* (loss of income because of disability, thus resulting in economic death).

The first two liabilities can be offset by having a well designed life insurance program and participating in some form of retirement program. Many executives and other key personnel are adequately protected against these first two hazards; but, as indicated in the accompanying table, the probability that a long-term disability will occur, rather than death, is better than two to one for a man age 40.

As evidenced by the comparison table, during the greater part of a man's working lifetime, the chances of suffering economic death are greater than the hazard of actual death itself. This is indeed a serious problem, not only to the individual involved but also to his employer. Consider the case of Jim Bennett.

Enforced Retirement Jim Bennett, 51, after 23 years of loyal service is a department head. He earns $12,000 a year, has a nice home in a good neighborhood, is married, and has two children in college. He manages to save a little money to provide for his family's security in the event of his death, and to provide for an adequate retirement income; but most of his income, after taxes, is used to meet living costs. Without warning, Jim has a serious heart attack. His doctor tells him he faces the minimum of a two-year period of total disability, but the doctor knows that the chances are he never again will be able to pick up his business responsibilities.

Every sizable concern has a number of men who face the same financial disaster in cases of disability. Some of them earn less, some of them earn more than Jim Bennett. They are vice-presidents, sales managers, department heads, engineers, or supervisors; they make up the group upon which the concern primarily depends for future growth and progress. Whatever their title

COMPARISON OF DISABILITY 90 DAYS OR LONGER AS AGAINST MORTALITY

(Per 1,000 Lives Exposed)

	AGES 30	40	50	59
Annual rate of disability	3.3	5.4	11.7	26.7
Annual death rate	1.2	2.3	6.3	15.9
Chance that long-term disability will occur rather than death	2.7 to 1	2.3 to 1	1.8 to 1	1.6 to 1

Average Duration of Disability Which Lasts Three Months or Longer

AGE AT DISABILITY	DURATION
30	4 years
40	4½ years
50	5½ years
59	6½ years

or income, the chances are slim that any one of them could survive financially for very long without a regular salary.

Jim Bennett has several alternatives which will enable him to keep his head above water financially, at least in the immediate future. He can encroach upon his retirement funds by electing "disability retirement," if the plan affords that option. He can "borrow" from his savings or life insurance. But most probably he will look to his employer for help. The firm has, by all standards, a good sick leave program based upon length of service. Because of his length of service, Jim Bennett is eligible to receive all or some portion of his salary for six months.

In thinking of his relationship with his employer, he reasons like this: "Since I have worked long and hard for the firm, they might disregard the sick leave program in my special case and continue my income for a while longer. After all, I have had my part in the company's success and profits."

Bennett, however, is a business man; he counters his own speculation with business logic. "It is a *business* concern," he reasons. "They have never promised me anything more than the sick leave program. If they agree to anything additional for me, they will have to do it for others. I just don't know whether they can actually afford to pay me for not working while paying someone else to take my place."

Even if the company found it possible to make payments beyond the sick leave period, these extra payments would not answer all the problems in Jim Bennett's mind. First, he has always worked for his money, and has a natural reluctance about receiving any portion of his salary which he cannot earn. Further, although he receives money month by month, he can't ask how long it will be continued. Thus an important element of minimum security is still missing.

Top management of Bennett's firm probably is thinking along the same lines.

"Jim Bennett," the company president reasons, "has devoted many years of loyal and valuable service to this company. A part of our profits are a reflection of his efforts. He is a personal friend and a valued business associate. On a purely personal basis, this company should guarantee Jim Bennett a decent living beyond the date of his last sick leave check. But, on the other hand, top management is responsible for showing a profit. Is it fair to the stockholders to take their money and give it to a man who does no work? We will have to put another man in Bennett's place at the minimum salary of $12,000. And any special arrangement we make for Bennett will have to be strictly confidential. Suppose something similar should happen to a man like Ralph Bronson. Bronson makes $9,600 a year . . . been with us for 12 years. We simply can't take on the unknown liability of continuing salaries for all our employees who become disabled, over and above the cost we must pay in salary for their replacement."

Whatever the final conclusion, it probably will be unsatisfactory to Jim Bennett, to the firm, or both.

Economic Protection

However, this problem could have been minimized if Jim Bennett had been protected under a Disability Salary Replacement Plan such as that sponsored by the N.S.G.A. and N.R.M.C.A. for executives and key personnel of their member-companies. Under this association-sponsored plan, it is possible for member-companies to secure for qualified executives and key personnel the highest type of non-cancellable and guaranteed fixed-premium salary continuance insurance at substantially reduced costs.

The Plan is completely flexible; if desirable or necessary, it may vary by classes of employees or even by individuals. This flexibility applies to (1) the amount of monthly disability benefits to be provided; (2) the length of time for which total disability benefits are to be paid; and (3) the number of days before benefit payments are to begin.

Tax Advantages

In addition, there are important tax advantages to be realized by both the employer and the employee. For the *employer*: premiums paid on salary continuance insurance policies are deductible as a business expense. This applies whether the employer pays all or part of the premium for *one* employee or a *group* of employees.

For the *employee*: an employee may receive up to $100 a week of *tax-free* benefits from loss of time insurance purchased by his employer. The premium which the employer pays does not constitute taxable income to the employee.

Benefits vs. Cost

"All well and good," you might say, "there's no question that this type of coverage fills a most important need and is of tremendous advantage to both the company and the employee involved; but what about *cost*?" Perhaps this question can best be answered by the following illustration setting forth the benefits and costs under a typical plan:

Employee	Age	Monthly Benefit*	Monthly Cost**
J. V.	46	$500	$39.75
H. K. V. ..	46	500	39.75
B. E.	32	400	22.80
R. S.	41	400	28.00
R. G.	34	400	23.60
J. H.	45	400	31.20
W. W.	46	400	31.60
			$216.70

*This is the monthly benefit which would be payable to the employee for the rest of his life in the event of his disability resulting from an accident; if the disability resulted from sickness, the benefit would be payable until age 65.

**Costs are based on immediate commencement of payments if disability results from accident; if disability results from sickness, payments would begin on the 91st day following the date of disability.

The typical program illustrated above costs the company involved $1,820.28 per year on a net after tax basis, assuming a 30 percent corporate tax bracket. In light of the advantages gained, this cost is comparatively low.

Other Factors

There are, of course, other factors besides cost to be considered in establishing a Disability Salary Replacement Program. The most important are the following:

► 1. The coverage should be non-cancellable and guaranteed renewable to age 65; once it is issued, it cannot be changed in any way by the insurance company.

► 2. The premium cost should also be guaranteed; once issued, the pre-

(*Continued on page* 107)

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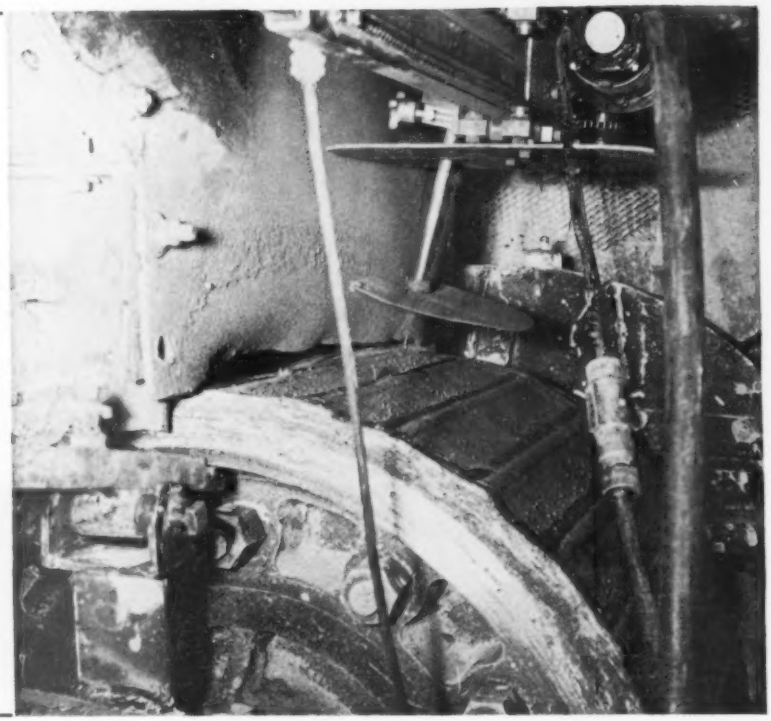

The Stoody CRUSHERMATIC is a new tool for the aggregate producing industry! It cuts rebuilding and hard-facing time on crusher rolls as much as 300 to 400% over manual welding and is 200% faster than hand-held semi-automatic welding!

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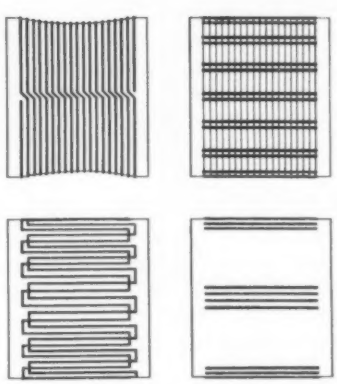


A wide range of weld patterns can be set up with the electronic controls for rebuilding any specific wear problem.

STOODY COMPANY

11940 E. Slauson Avenue, Whittier, California

The Lime-Silicate Plant

Part III–Economic Factors

By WOLF G. BAUER
Consulting Engineer

THE concept of a multiproduct lime-silicate plant is a logical and sound application of centralized manufacture of commonly available and compatible raw materials to related processing techniques and markets. We offer this concept as one of particular importance and interest to prospective investors in new plants and businesses in the field of nonmetallic minerals processing.

Lime-silicate technology is both ancient and modern. But only within the last 25 years have we acquired the mineralogical background, the processing know-how and tools, the proper market climate, and the specification safety which now provide economic feasibility and assure technical success to an integrated operations system of the type here under discussion. This is true not only from the standpoint of economics when applied to the highly competitive markets within the United States and Canada, or Europe; it also holds for the even more obvious reasons of catering to diversified market needs in more isolated and less competitive regions of the world.

Marketing Factors The potentially wide range of product diversification through the combined utilization of one raw material each, of the lime and silicate rocks (or waste materials), offers the prospective manufacturer some rather significant advantages over the single-raw-material processor. Not only will he be able to cater to the manufacture of products bringing higher returns if he has some choice and variety; one product will often sell another through similar sales channels and associated applications and clientele. This is particularly effective in featuring a family of "compatibly-designed" construction market products through single-brand advertising. A notable example might be, for instance, a large housing project for which the lime-silicate plant furnishes indirectly or directly, the following materials:

Wolf G. Bauer

Brand X heavy and lightweight aggregates for concrete pourings and foundations;

Lightweight aggregate for prefabricated beams and decks, and for masonry units;

Pozzolan additive for such concrete and chemical buffer in concrete sewage and drain pipe;

Silicate cement, hydraulic lime, or pozzolan cement for steam-curing these products;

Lime-silicate-gas mix for foamed autoclaved masonry products;

Heavy or compatible lightweight mortar sand;

Hydrated lime, hydraulic lime, or an admix of masonry cement made from any one or more of the above mentioned cements for use in the masonry mortar;

Premixed lime-silicate stucco and cement paint for wall coverage;

And perhaps a soil-stabilization lime-silicate cement blend for all foundations and road work connected with the project.

The lime-silicate plant could furnish all these Brand X compatible products with certain economies through centralized and integrated marketing, production, control, shipping, booking, and job responsibility.

The ability to cater to several markets with various products also tends to level out production peaks and valleys due to seasonal or other fluctuations. Thus market diversification offers the prospective investor a steadier year-round operation and earnings. The larger combined material-processing output that is possible with a combination plant is necessarily reflected in lower individual product costs. In this respect the lime-silicate plant, although perhaps furnishing only moderate tonnage of any one product to any one market, may nevertheless be competitive with larger single-product operations.

Investment Factors The lime-silicate plant represents a more complex operation than most of the single-raw-material plants operating in the industry. Many of the normally provided processes of crushing, screening, calcining, hydrating, grinding, and classifying are carried out in the usual manner, or with only minor variations. However, deviations from the normal procedure occur not only with the wide variety of materials, including sticky clay, hard rock, and fine ash, but also with less widely known techniques for either plastic or dry forming

Table 3—Investment and Cost Comparisons

	Investment per Daily Ton Produced	Over-all Average Earnings per Ton (Before Taxes)	Annual Return on Investment (Average)
Expanded Shale Plant	per yd. ..$1500- 2000 per t. ...$2500- 3500	$1.00- 2.50 $1.50- 3.75	25%
Pozzolan Plant	$3500- 4500	$4.00-10.00	50%
Lime and Hydrate Plant	$3000- 4000	$3.00- 6.00	35%
Portland Cement Plant	$9000-12000	$2.50- 5.00	15%
Lime-Silicate Plant	$4000- 6000	$4.00- 8.00	40%

operations of pelleting-extruding-briquetting, blending, sub-micron particle production and range composition and over-all system control from the deposits to final products.

In addition to a larger variety of machinery, the greater demands on flexibility and multiuse adaption design also result in somewhat higher equipment and installation costs. Plant investment must be judged realistically, however—not only on the basis of cost per ton of capacity, but also on the basis of returns on the investment. Table 3 in this series compares some of these costs and ranges for plants of similar size (medium tonnage).

Lime-silicate plant operation requires not only designs engineered from practical know-how and familiarity with each of the raw materials and processes; in addition it requires a good deal of "fresh-approach" adaptation of equipment to multipurpose usage to avoid running into unnecessary duplications and costs. It is at this point that the degree of capital investment will be decided and most influenced.

Multipurpose use presupposes certain alterations, additions, or oversizing and overdesigning of equipment which will increase first cost. This is to be expected. On the other hand, it must be kept in mind that full-time use of such equipment or a system designed for shared operation is still substantially cheaper than part-time use of several separate units. Dual drive or motors on a single machine in order to meet wide-range needs in horsepower or speed with successive materials may be one example of multiuse adaptation. The next process unit or system may be only partially used, perhaps requiring shunts, bleed-offs, by-passes or additional accessory devices to operate at different maximum capacity and efficiency. This may be the case with solids- as well as gas-handling equipment, and affects proper treatment time, temperature, pressure, flow pattern, capacity, etc.

Handling and processing several materials successively demands surge storage at various points in the process, and plant costs are increased for extra storage space, particularly for reclaiming provisions. Here, too, it is possible to utilize shared storing and reclaiming facilities by careful multipurpose design.

Table 4—Production Energy and Cost Comparisons
Basis, 300 tons (yards) product per day

Cost Item	Expanded-Shale L.W. Aggregate (1 Raw Material)	Hydraulic Cement (2 Raw Materials)	Lime Products (1 Raw Material)	Pozzolan Products (1 Raw Material)
Deliv. Raw Material	$0.50/yd.	$1.00/t.	$1.50/t.	$0.75/t.
Direct Labor	$0.70	$1.35	$1.00	$1.10
man-hr./t. (yd.)	.30	.60	.43	.50
Power	$0.15	$0.70	$0.20	$0.50
kw.-h./t. (yd.)	15	70	20	50
Fuel	$0.90	$2.25	$3.15	$1.35
Mil. B.t.u./t. (yd.)	2	5	7	3
Maintenance	$0.20	$0.40	$0.40	$0.30
Additives	$0.00	$0.50	$0.00	$0.50
Direct Total	$2.45	$6.20	$6.25	$4.50
Depreciation (10%)	$0.50	$1.50	$1.05	$1.20
Overhead	$0.70	$1.50	$1.60	$1.15
Total Cost	$3.65	$9.20	$8.90	$6.85
Two-Product Plant (Same individ.-prod. tonnage)	$3.00	$7.60	$7.40	$5.70
Three-Product Plant (Same individ.-prod. tonnage)	$2.75	$6.90	$6.55	$5.15
Two-Product Plant (½ of original product tonnage, each product)	$4.15	$9.90	$9.40	$7.35
Three-Product Plant (1/3 of original product tonnage, each product)	$4.00	$9.55	$9.25	$7.20

BASIS OF COSTS

Raw Materials: Multiple-use limestone and shale in proximity, open pit.
Plant Capacity: 300 t.p.d., 95,000 t.p.y. (equivalent ½ million bbl. cement).
Labor: Average of $2.25/hr. **Power:** 1-cent/kw.-h. **Fuel:** 45-cents/mil. B.t.u.
Depreciation: 10% average for median plant cost from Table 3.

Processing Costs Manufacturing costs of the lime-silicate plant will vary much more than costs for more "normal" aggregate-producing operations, expanded-clay or expanded-shale plants, or even lime plants. This fact is related chiefly to the large variety of raw materials available to such a multipurpose plant. These raw materials not only differ considerably in cost, as laid down at the processing plant; they also affect various combinations, techniques, and costs for producing the required products. Hence, we can discuss only averages and ranges of costs.

Attention has already been called to the fact that each product of the lime-silicate plant will cost less to manufacture than if it were produced in a specialized single-product plant —*i.e.*, on an equivalent individual product output basis. This is the economic attraction and justification for the lime-silicate plant. Such an advantage stems from the possibility of manufacturing a product at low output tonnage, yet at costs related to high-volume production where the overhead and production cost savings are shared and apportioned with the other products also manufactured with some of the same equipment and systems.

One does not have to look far to note the trend toward fewer and larger production facilities which tend to force the small-volume operator into an ever shorter and more restricted shipping and marketing radius. Each additional product adds to the over-all plant output, and thus has its cost-lowering effects on all other products through shared overhead, labor, and depreciation charges.

Table 4 is presented to provide a picture of comparisons in manufacturing costs of four basic products plants which, if combined for two or more products, would constitute an example of the lime-silicate plant concept.

In order to compare production costs, it must be assumed that all plants are located in the same locality, and that all are therefore subject to equal labor, power, fuel, and materials costs. Costs shown are based on finished product ton (or cubic yard) and take into account normal moisture and chemical water losses in shales and clays, carbon dioxide and dust losses for lime, plus water regained in hydration.

Production costs with shared equipment and combined operations, but without increase in original product tonnage (as it would hold for a lime-silicate plant), are approximately 83 percent when two of the basic products are combined, and about 75 percent when three are handled by a single plant. These cost savings accrue from about a 25 percent reduction in raw material, labor, maintenance, and depreciation costs, and a slightly greater reduction in overhead charges. Power, fuel, additives, etc., remain the same.

Considering, on the other hand, manufacturing costs on the basis of a 300 t.p.d. lime-silicate plant in which each original-product output is reduced to one-half (in the case of a two-product plant) or to one-third (in the case of a three-product plant), production costs for each respective product are only slightly higher than they were in the single product plant at the original double or triple production rate. Here the increase is due to higher relative plant cost, an item which affects only depreciation charges.

Since profits vary with each product in a multiproduct plant, total earnings will be affected by the relative tonnages of each product sold, but they are not necessarily related to the comparative quantities of either lime or silicate materials mined or quarried.

Of the many available lime and silicate raw materials, only two have been used here for illustrative purposes. Each of the many others and their varied combinations will show lower or higher costs than those given in the table. The comparative trend in cost changes under the given conditions will apply, however, to other materials and products, and may be applied for preliminary evaluations.

The cost figures presented in the tables are intended to show cost distributions and comparisons only. They do educate us, however, to the fact that the concept of combining two or more compatible materials for diversified production can well be the answer to increased earnings for the small-to-medium operator in meeting competition of larger single-product plants in modern construction markets.

Employee Benefit Program

(*Continued from page* 102.)

mium cannot be increased, even if there is a change to a more hazardous occupation.

► 3. Provision should be made for 24-hour coverage, so that payments received would be in addition to those payable under Workman's Compensation in the event of occupational accident or sickness.

► 4. The definition of disability in the coverage should be liberal and yet realistic in order that the Plan may achieve its objective—namely, salary replacement during periods of disability.

Summary While there are other points which must be considered, their relative importance will vary from one company to another. A Disability Salary Replacement Plan must be designed and engineered to meet the specific needs of the company adopting it. Remember, as in any type of benefit program, the objectives must first be decided and the costs of accomplishing them measured in the light of the advantages to be gained.

Expansion is planned at Consolidated Sand & Minerals, Inc., a newly organized company at Chattanooga, Tenn. The $250,000 plant at Lookout Mountain, which has been producing 700 t.p.d. of sand, is adding equipment valued at $150,000. Present production is expected to be doubled.

The cement mill at Beli Iswor, near Wraza, Bulgaria, has begun trial operations. The plant will eventually have an output of 400,000 tons per year, which will represent 24 percent of Bulgaria's total cement production capacity. The mill is reportedly Bulgaria's first cement plant based on the Lepol principle.

The Antonito, Colo., blending-and-loading installation 24 miles north of No Agua. Processed perlite is trucked from the latter point to this railhead for shipment preparation.

Opposite page: Overlooking the area of an ancient Indian culture, the new perlite mill of J-M near No Agua, N. Mex., is an impressive contrast to the cultures of antiquity. This operation has a rated annual capacity of 150,000 tons of processed perlite.

"Step-child" of the nonmetallics family gains stature

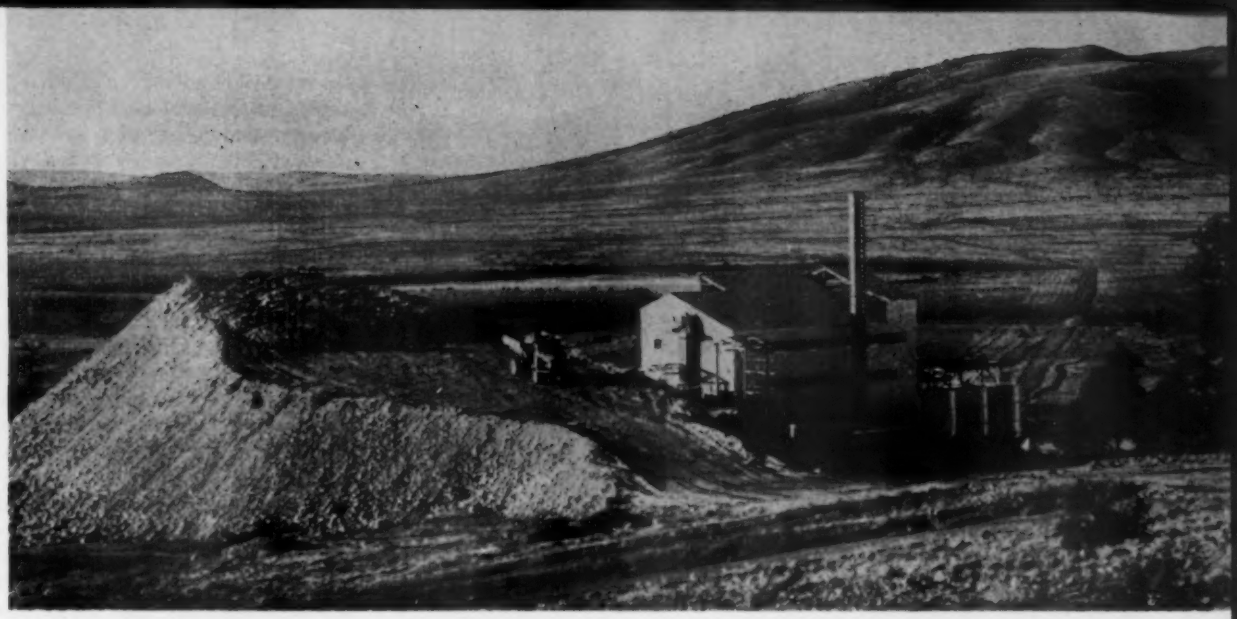
Modern Perlite

The crawler at the top handles clearing, stripping of overburden, ripping of the ore in place, and dozing of the pit-run material to truck-loading cribs (center).

IN AN area where a prehistoric Pueblo Indian culture once flourished, Johns-Manville has erected an outstanding example of the modern complex industries required to serve present-day cultures. Last December the firm opened a new multilevel perlite mill at No Agua, N. M., which has been described as the largest and most advanced in the industry.

Representing an investment of more than $1 million, the mill has an annual capacity of 150,000 tons of processed perlite. Appropriately, the new installation is on the site of what is said to be the world's largest known deposit of perlite ore.

The No Agua plant and the deposit are located in a high valley west of New Mexico's Sangre de Cristo range in the "Seven Hills of Taos" area. Johns-Manville, which entered the perlite industry only little more than a year ago with the acquisition of F.E. Schundler & Co., Inc., Joliet, Ill., is developing a 2,000-acre mining property that contains reserves estimated to ex-



Production in J-M's No Agua Mill

ceed requirements for more than 100 years.

A second important phase of J-M's perlite development is the blending - and - loading installation erected at Antonito, Colo., at a railhead 24 miles north of No Agua. Milled perlite is trucked from the latter to Antonito, where it is prepared for shipment.

Based on J-M specifications, engineering and construction of the mill were handled by Johnson and Johnson, Inc., Chicago, Ill. The main building, 60 ft. wide, 100 ft. long, and 80 ft. high, is adjoined by a 2-level dryer building. These buildings were constructed of Transite siding on steel framework, and extensive use was made of Corrulux translucent fiber glass panels in the sidewall construction to admit as much natural light as possible. Adjacent to the main structure are nine individual silos that provide a 2,150-ton storage for processed perlite.

Mill load power requirements of 800 hp. are met with a 440-v. system, supplied from a 69,000-v. utility line which runs for about 50 miles between the mill site and Questa, N. M. Auxiliary service is available from a pair of 300-kw. diesel generators in the mill's power plant.

Strip mining techniques are effectively used in removing ore from the deposit adjacent to the mill area. Three primary steps are involved—stripping of the overburden, ripping of the ore to break it up, and haulage to the mill. The first two steps are handled by a TC-12 Euclid tractor, which is also employed in clearing away trees and brush.

After removal of 5 to 9 ft. of overburden, the ripper breaks the ore into loose material which is 'dozed into truck-loading "cribs." These are excavated below grade to permit pushing the ore directly into rear-dump haulage trucks. The latter dump on a stockpile area near the mill, from which the ore is subsequently reclaimed for mill feed.

Owing to the severe winter weather in this mountain area, mining operations are conducted only in the spring, summer, and fall. Mine output during those months provides adequate surge for milling during the remainder of the year.

As reclaimed from the stockpile area, the raw ore is 'dozed by a D8 Caterpillar crawler-tractor into the hopper of a 25x40 primary jaw crusher. Products of this reduction are conveyed to a scalping screen from which the throughs are chuted to a bucket elevator.

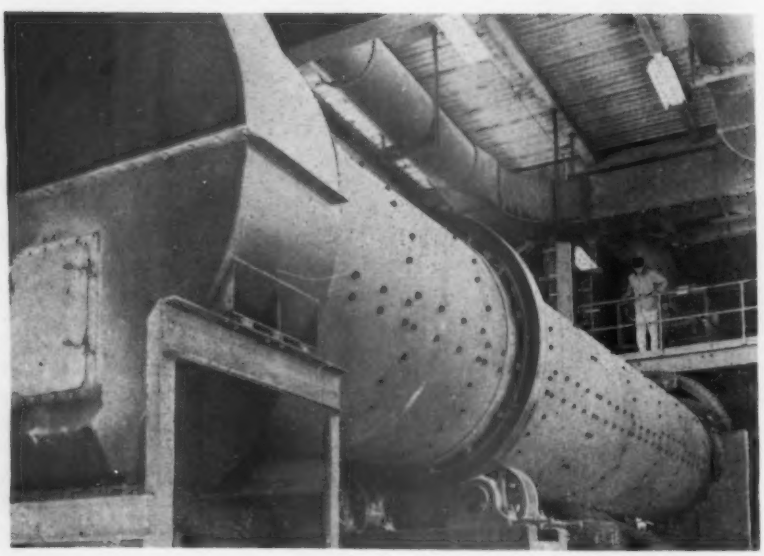
Material retained on the scalper is conveyed to a 14x24 secondary jaw crusher. Discharge from this unit also is chuted to the bucket elevator; and the crusher-run and scalper throughs are raised to discharge into a 100-ton surge bin.

A pair of Hardinge constant-weight feeders are used to draw from the surge for transfer to the next processing stage. The latter is comprised of a pair of 6- by 50-ft. Bartlett and Snow parallel rotary dryers. After being dried in these oil-fired units, the ore in process is received on a Link-Belt vibrating conveyor for cooling. Cooled ma-

Crude ore is stockpiled at the plant site in sufficient quantity to accommodate the mill operations during the winter months, when mining operations are shut down. The crawler plant dozer seen here is pushing ore from the stockpile into the hopper of the primary jaw crusher.

Left: Products of primary reduction are conveyed to a scalping screen, from which retained ore is delivered to a secondary jaw crusher. Crushed material and scalper throughs are then carried to a surge bin for mill feed.

Below: One of the two parallel 6- by 50-ft. rotary dryers through which the crushed ore is processed before it enters the various screening and final crushing phases.



terial is then transferred to a bucket elevator and raised to a belt conveyor feeding a 4- by 8-ft. Tyler scalping screen.

Oversize from the latter is chuted to a Hydrocone secondary crusher, and the discharge from that unit plus the finer fraction from the scalper are delivered to another bucket elevator. The flow is then received on a Carrier vibrating conveyor that supplies equal amounts of material to each of the banks of primary screens.

These double-deck Tyler Hummers make separation of over- and under-size fractions from the intermediate fraction. The under-size passes to another bank of screens for further grading, and the largest material is delivered to a battery of Denver rod mills. Milled ore is then rescreened, and retained fractions are returned to the mills in closed circuit.

The minus 30-mesh material is next fed to a group of Raymond air separators, where "ultra" fines and dust are removed from any desired size range. Finished products are transferred to the appropriate one of the steel storage silos noted earlier. Eight of these units have individual capacities of 250 tons; the ninth holds 150 tons. All silos are mounted on steel columns to accommodate gravity loading of trucks for the haul to Antonito.

The over-all milling process was developed by personnel of J-M's Celite Division, which also operates the plant. It was aimed at incorporating the maximum of processing flexibility to meet individual customer specifications and to provide balanced inventories of finished perlite fractions.

Quality control specialists maintain a rigid program of sampling and analysis throughout the entire processing cycle. Production samples are constantly checked for screen gradation and moisture content.

One of the features of the new mill contributing significantly to the efficiency of its operation is the extensive provision for dust control. Each unit of processing equipment is enclosed, and dust is removed *via* exhaust fans and ductwork that leads to a 6- by 128-ft. stack.

In the final stage of operations at the new mill, graded perlite

fractions stored in the elevated silos are loaded into trucks for transfer to the blending-and-loading plant at the Antonito railhead, 24 miles north. All trucks are covered to protect the material from contamination and to guard against absorption of moisture enroute.

At Antonito, the haulage trucks dump into a bucket elevator system that delivers the various grades to the appropriate unit in a battery of storage bins through chutework and conveyors. From this storage, customer orders are met by drawing from any single bin, or any combination of bins for a blend, with control from a central panel. As each railcar is loaded, samples are taken to ensure that customer specifications are being met.

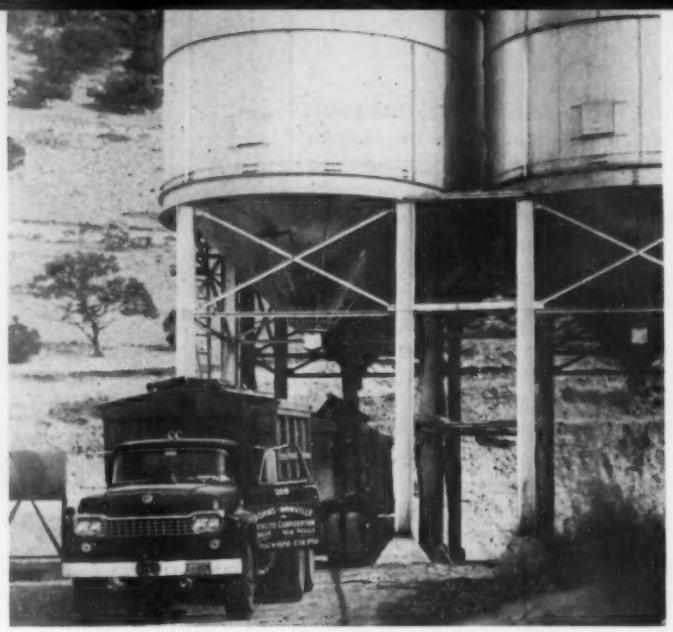
J-M's impressive new perlite operations make an eloquent testimonial to the vigorous upward surge of the industry. Virtually unknown 20 years ago, perlite was produced at the rate of only 58,000 tons just over a decade ago. Last year the industry produced 276,000 tons of expanded perlite—a growth of nearly 500 percent.

This siliceous volcanic mineral, once regarded as useless, is now considered amazing in its characteristics and potential applications. Its unique physical characteristic of natural entrained moisture in each individual particle permits expansion up to 20 times its original volume when crushed and carefully sized material is heated under controlled conditions. This feature and its inherent low density have catapulted the material to a prominent position as a lightweight aggregate for use in plaster and concrete. It is also gaining new importance as an additive in paints, paper, plastics, resins, and other chemical products; and increasing uses are being found

A battery of double-deck screens in which the dried ore particles are separated into desired size ranges. These screens and all other processing components in the mill are enclosed and vented through ductwork by exhaust fans to provide dust-free operations.

The power distribution center for the mill's 440-v. system that supplies the connected 800-hp. load. A 69,000-v. utility line covers a distance of 50 miles from Questa, N. M., to the mill's transformer station. Two 300-kw. diesel generators are also available for auxiliary power.

Below: Virtually any blend desired by the customer can be delivered via electronically controlled loading from the bins at Antonito. As each railcar is loaded, samples are taken to ensure that customer specifications are being met.



Nine of these elevated steel silos at No Agua provide a 2,150-ton storage for graded perlite. Here trucks are loaded by gravity for the 24-mile haul to the railhead at Antonito.

for its application as a filtration medium, for soil conditioning, and as insulation.

Resident J-M manager of the No Agua and Antonito operations is Martin B. Mickelsen, a veteran in the perlite mining industry. C. J. O'Neil, vice-president of the Johns-Manville Products Corporation, is also general manager of the Celite Division which operates the perlite facilities. W. J. Petersen is the Celite Division production engineer.

Centrifugal Pump Manual Offers Usable, Detailed Data

Centrifugal Pumps: Selection, Operation, and Maintenance, is the title of a reference book recently published by F. W. Dodge Corporation. It presents comprehensive information for operators, buyers, and designers of these pumps.

Authors of the volume are Igor J. Karassik, consulting engineer and manager of planning, Harrison Division, Worthington Corporation, and the late Roy Carter, who was public works consultant and manager of the Volute section, Worthington.

The 488-page handbook covers the entire field of centrifugal pumps, their drivers, controls, and other appurtenances. It is illustrated with 575 drawings, photographs, charts, etc. Its chief service is reportedly that it stresses practicality, rather than theory.

Price, $15.75 per copy. Published by F. W. Dodge Corporation, New York, N. Y.

Lower S-G Output in 1960 Shown in Preliminary Report

Production of sand and gravel in 1960 was about 5 percent below the 1959 level, according to preliminary reports of producers released to the U. S. Bureau of Mines, thus halting the ten-year upward trend. Total production was estimated at 692 million short tons, valued at $682 million, compared with the 1959 output of 730 million tons, valued at almost $729 million.

The decline in sand and gravel production was attributed to a decrease in total new construction put in place during the year. The value of total new construction in the first ten months of 1960 dropped 2 percent below that of the same period of 1959. Both public and private construction shared in the downtrend.

Based on the first ten months of 1960, the value of highway construction, which was more than one-third of the total public construction, was 4 percent less than in 1959. Of the projected 41,000 miles of interstate highway network, more than 20 percent has been completed, and 10 percent is under way.

Use of portable plants for sand and gravel production continued to increase, making possible the use of small deposits near the jobsite. Trucks continued to replace railroads as a means of transport. Investments in new plants and equipment leveled off in the last few months of 1960.

Japanese Cement Output Increased 15 Percent

Because of its position as a highly industrialized nation adjacent to the huge undeveloped area of Southeast Asia, Japan is now a major exporter of both cement and cement plants. Cement production in 1959 was more than 17,000,000 tons—15 percent higher than in 1958.

In 1958, exports ran at about 10 percent of the total output. Traditional markets include Korea, the Ryukyu Islands, Hong Kong, Malaya and Singapore, Indonesia and the Indochina region.

Gravimetric Test Described For Strontium in Cement

Bulletin 112 of the Portland Cement Association's Research Department, entitled *The Gravimetric Determination of Strontium Oxide in Portland Cement,* has been reprinted in booklet form from the April, 1960, issue of the American Society for Testing Materials *Bulletin.*

The gravimetric method presented in the bulletin gave results which are slightly lower but in good agreement with flame photometric values. Limited tests of samples of known strontium content indicates that results obtained with the gravimetric method are more accurate than with the photometric method.

Author of the report, C. L. Ford, is an analytical consultant in the P.C.A. Research and Development Division.

The main office of the Peninsular Division of General Portland Cement Company, Inc., Chicago, will be opened in Fort Wayne, Ind., on March 1, with C. J. Cox as sales director.

Cement Imports And Exports in 1960

INFORMATION on cement imports and exports was available for only nine months of 1960, but this data makes it evident that imports of cement for the year will be considerably below 1959. Bureau of Mines figures show that imports through September, 1960, were 3,133,370 bbl., valued at $8,069,001. This compares to 3,724,423 bbl., valued at $9,134,762, through September, 1959, and 2,247,736 bbl., valued at $5,929,218, for Jan.-Sept., 1958.

The Bureau estimates imports for all of 1960 at about 4,200,000 bbl., valued at $10,700,000. This compares to 4,978,661 bbl. ($12,267,567) for 1959 and 3,110,667 bbl. ($8,059,683) for all of 1958. These figures for 1960 are encouraging and indicate that the great amount of publicity and the growing producer resistance to this threat may be having some effect. This foreign competition has had an increasingly depressing effect for several years but apparently has been making itself felt more this year because of the lower demand and growing domestic capacity.

The 1960 figures indicate an average price of $2.90 per bbl. for imported cement. This compares with $2.45 in 1959 and $2.64 in 1958. The average price of domestic cement was about $3.35 per bbl. in 1960, $3.30 in 1959, and $3.27 in 1958. U. S. producers were therefore handicapped by a price differerence of $0.45 per bbl. in 1960, $0.85 in 1959, and $0.63 in 1958. Efforts made by producers to get a higher protective tariff which would prevent such dumping have been unsuccessful, and prospects for the future are not encouraging.

Canada was again the leading exporter to this country, with a total of 628,000 bbl. in the first 9 months of 1960, but this was a sharp drop from the 997,000 bbl. exported in the same period of 1959. Colombia was again second, with 424,000 bbl., down from 556,000 bbl.; and Belgium was third, with 407,000 bbl., down from 524,000 bbl. Portugal, which was not in the first ten in 1959, was fourth, with 208,000 bbl., replacing West Germany, which is not in the first eight this year. Norway is again fifth, with 203,000 bbl., down from 360,000 bbl. Sweden moved from seventh to sixth, with 189,000 bbl.; Poland from eleventh to seventh with 178,000 bbl.; and Israel from sixth to eighth, with 125,000 bbl.

During the first nine months of 1960 the leading import districts were: Florida (672,000 bbl.); Connecticut (635,000 bbl.); Rochester, N. Y. (375,000 bbl.); Massachusetts (343,000 bbl.); Puerto Rico (272,000 bbl.); New York City (204,000 bbl.); Philadelphia (149,000 bbl.); and Rhode Island (123,000 bbl.).

Producers in this country have made no great effort to counteract these imports by greater exports, partly due to the fact that most other countries have prohibitively high import duties. Several companies, however have taken (or announced) steps which would put them in a better position to compete with the now cheaper foreign cement along the Atlantic Coast. One large company, with plants on the Hudson River, contemplates establishing permanent shipping plants at deep water sites in several ports of entry along the New England Coast, supplying them by river and coastal transportation. Another large company has announced the acquisition of sites at Norfolk, Va., and Jacksonville and Cape Canaveral, Fla., for cement distribution stations. Another may be located at Port Everglades, Fla. The same company, through a subsidiary, has entered into an option for property and cement manufacturing rights at Freeport, Grand Bahama Island. Engineering studies for a large cement plant there are being completed. Most of the cement would be sold in the United States and other world markets. Such an operation, incorporated under English laws, would enjoy a highly favorable tax benefit and cheap labor. Still another large company is expanding the capacity of its existing plant at Norfolk, Va.

On the subject of imports, a large company operating plants east of the Mississippi River says: ". . . It is our belief that the importation of this cement contravenes the Anti-Dumping Act. It is devoutly hoped that the Treasury Department will apply the necessary remedial measures by collecting additional duties from the guilty importers. We hope to ask the help of the United Cement Lime & Gypsum Workers Union on this problem. Militant aid on their part could go far toward rectifying the situation. . . . Many of the plants serving the area where the impact is greatest have been compelled to seriously curtail operations."

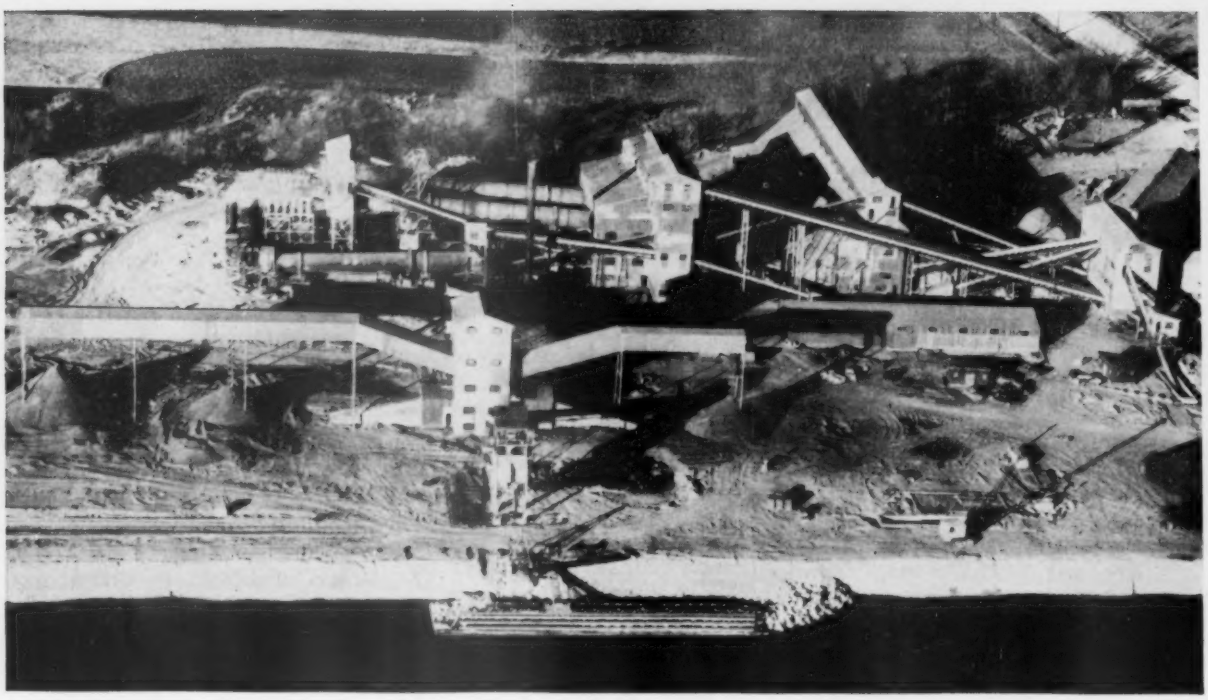
Exports of portland cement from the United States to foreign countries for the first nine months of 1960 were only 158,278 bbl., valued at $961,456, but this volume was up 23 percent from the comparable 128,182 bbl. figure in 1959. Value was $6.00 per bbl., compared to $4.01 in 1959, according to the Bureau of Mines. Total exports for 1960 are estimated at 210,000 bbl., valued at $1,300,000.

Slight Drop in 1960 Output Of Crushed, Broken Stone

Crushed and broken stone production in 1960 was 2 percent below the peak attained in 1959, according to preliminary reports of producers released to the U. S. Bureau of Mines. Output was estimated at 570 million short tons, valued at $810 million, compared with 582 million tons, valued at $824 million in 1959. Lessened activity in both private and public construction contributed to the lower tonnage.

As in previous years, production included crushed stone used for concrete aggregate, roadstone, cement, lime, metallurgical flux, railroad ballast, refractory stone, agricultural limestone, abrasives, riprap, etc.

Production of flux stone used in steel making and limestone for lime manufacture increased slightly in 1960, but output of limestone for cement manufacture was 7 percent below the 1959 level. Aggregate for road construction in 1960 was close to the 1959 figure.

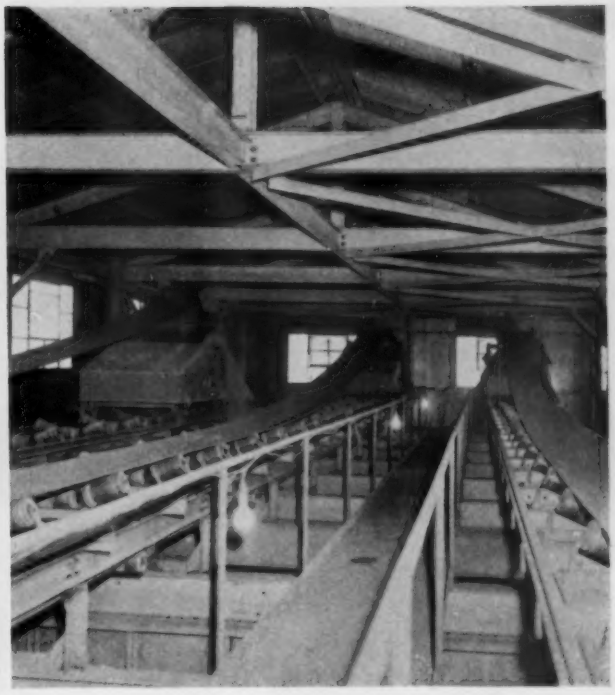


All sections of Material Service plant are shown here, including: foreground barge-loading and finished-product stockpiles; left dryer, kilns, and kiln firing buildings; right of center—raw shale storage, primary crushing and screening building.

MILE-LONG CONVEYOR SYSTEM USED IN NATION'S LARGEST EXPANDED-SHALE PLANT

Ground level plant view shows how mile-plus conveyor system is interlaced between buildings to provide a highly flexible materials handling operation.

View from primary crushing and screening building shows seven of 35 Barber-Greene conveyors in plant. Three units at left convey material to kiln feed bins in firing building. Two center units are in primary crushing-screening circuit. Conveyors on right move shale from raw screens to raw shale storage building.



Three Barber-Greene tripper conveyors that discharge shale and coal into appropriate kiln feed bins are shown atop kiln firing building.

35-unit Barber-Greene belt conveyor installation mechanizes highly efficient lightweight aggregate plant

The Ottawa, Ill., plant of Material Service, a division of General Dynamics Corporation, produces 1,500 cu. yds. of Materialite, an expanded-shale aggregate, daily. One of the most advanced plants of its kind in existence, it utilizes 35 Barber-Greene Conveyors, totalling 6,375′ in length, to move materials from truck-dump through a variety of processing phases, to finished-product stockpiles, from which it is loaded into railroad cars, trucks, or barges.

The result of nearly five years of investigation and research, the plant is the largest of its kind in the nation. And efficient plant production since the opening late in 1957 has more than justified the painstaking preliminary study by this aggregate producer.

The conveyor system – one of 34 Barber-Greene systems operating in Material Service plants around the nation – gives unusual flexibility of operation through three screening and three reduction phases, plus a wide blending range in kiln feed. Conveyors vary from 24″ to 36″ in width, and include a total of 1,473 heavy-duty idlers. The system has given trouble-free performance since plant operations began. Ability to stand up under the most severe abrasive and dusty conditions encountered in applications such as this have made Barber-Greene Conveyors the No. 1 choice of all types of aggregate plant operators.

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Enter 114 on card, page 169

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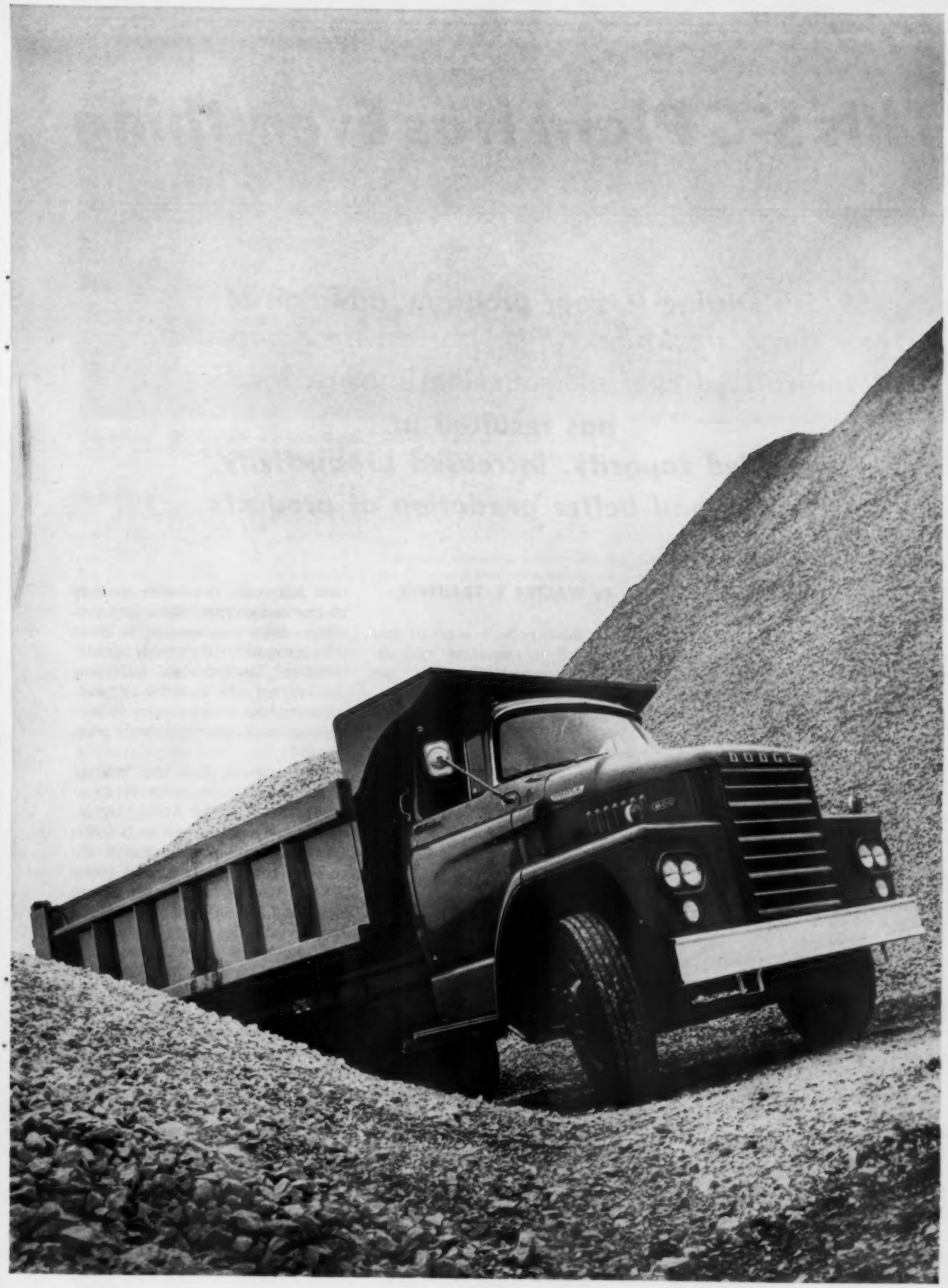
Dodge heavy-duty trucks for 1961 are the toughest, stingiest, workingest trucks we've ever built. Engines have been improved, beefed up all 'round. There's V8 gasoline muscle to 228 H.P., and Cummins diesel muscle to 743 cu. in. and 220 H.P. Frames, clutches, transmissions and axles have been strengthened to match. Swing-out fenders let you walk right up to the engine and service it fast. A BBC of 89¾" lets you put more load on less wheelbase, or pull a longer trailer. Those are two advantages of Dodge's cab forward design. Another: the cab simply can't go haywire, nor do you have to raise the roof to accommodate it. If you own a tilt-cab, you'll know what we mean. Toughen your fleet from a big choice of Dodge heavies. Trucks and tractors. GVWs from 19,500 lbs. to 53,000 lbs. GCWs to 76,800 lbs. Two other things to think about. The heavy-duty Dodge for your job is probably waiting your order today at a Dodge Truck Center. And now there's a 24-hour-a-day, seven-day-a-week ordering system for emergency parts. Delivery's soonest!

DODGE BUILDS TOUGH TRUCKS



Enter 116 on card, page 169

This S-G Plant Has Everything

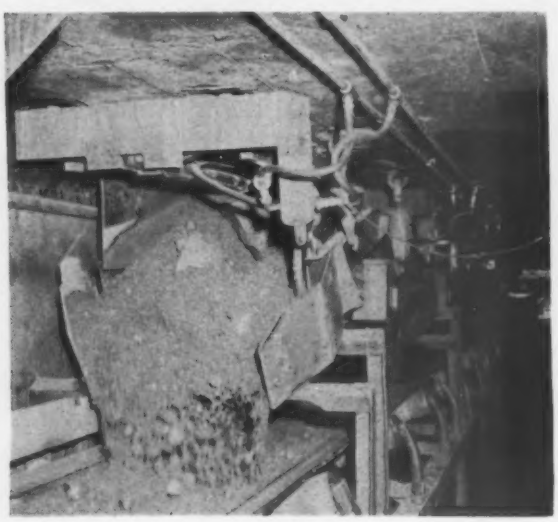
• During 9-year program, addition of *raw surge stockpile, latest processing equipment, centralized controls, automatic truck loading* has resulted in *doubled capacity, increased productivity, cleaner and better gradation of products*

By WALTER E. TRAUFFER

ANOTHER ON THE SPOT report

THIS description of of the Western Indiana Gravel Company's sand and gravel plant at Lafayette, Ind., might well be called a study of the evolution of that industry. Originally built in 1916 as a 250-t.p.h. car-loading operation with rotary screens, bucket elevators, and loading bins, this operation has been improved and expanded over the years as new equipment and methods became available and as stricter specifications and increasing competition made the changes necessary.

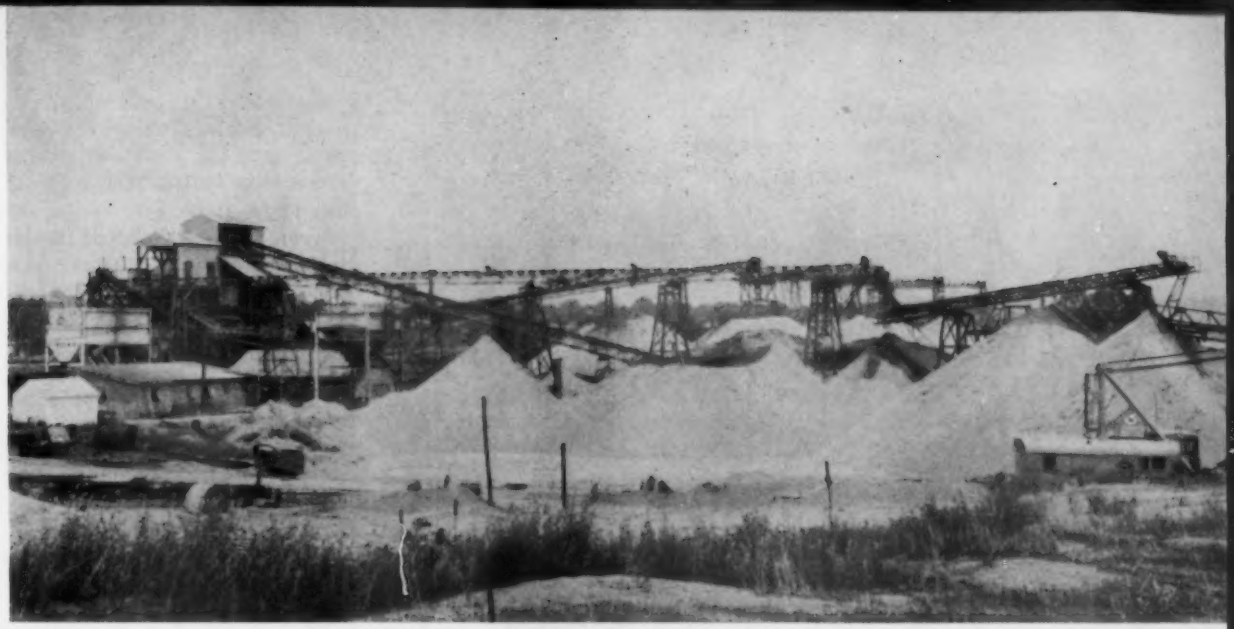
As a result, this is now a modern 425-t.p.h. plant using the latest proved equipment to produce a wide variety of sizes, with no increase in man-hours. This stepped-up productivity has about offset increased labor, maintenance, repair, and other operating costs during these years, and has made it possible to keep prices competitive. These improvements have also resulted in much cleaner and more closely graded products. Stockpiles and reclaiming tunnels are now used for all products, making it unnecessary to load cars or trucks under the main plant bins.



Six vibrating feeders under the raw surge stockpile insure steady feed of the minus 10-in. material to the processing building.

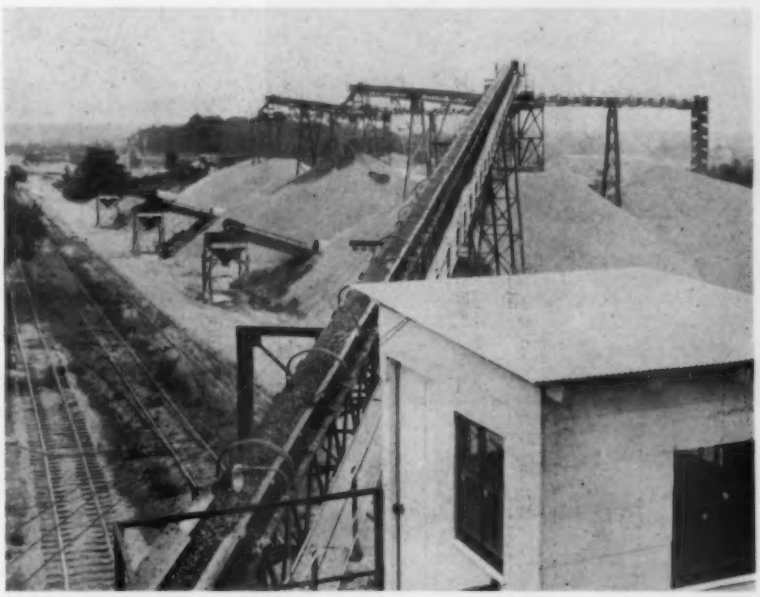
The original plant was built in 1916 by the Greenville Gravel Company. At that time M. A. Neville was vice-president, and he is still a vice-president and director of the present company. In 1920 a group of Danville, Ill., businessmen bought this plant and an affiliated operation in Terre Haute, Ind. This firm was incorporated as the Western Indiana Gravel Company. No corporate changes have since been made, but plants have been added at South Bend, Leesburg, Anderson, and Montezuma, Ind. The Terre Haute plant is no longer operated. The firm also operates the Elwood Sales & Mfg. Co. at Elwood, Ind., which does all major repair work for these plants and some manufacturing, including steel work, etc.; and it also bids competitively on conveyors.

Only minor changes were made in the Lafayette plant up to 1929, when vibrating screens and belt conveyors replaced some of the rotary



This general view of Western Indiana Gravel Company's plant at Lafayette, Ind., shows a part of the extensive stockpiling system. The sand stockpiles are in the foreground.

The gravel stockpiling system, with the three double stockpiles and reclaiming tunnels to the driver-controlled truck-loading bins. In the foreground is the plant control room.



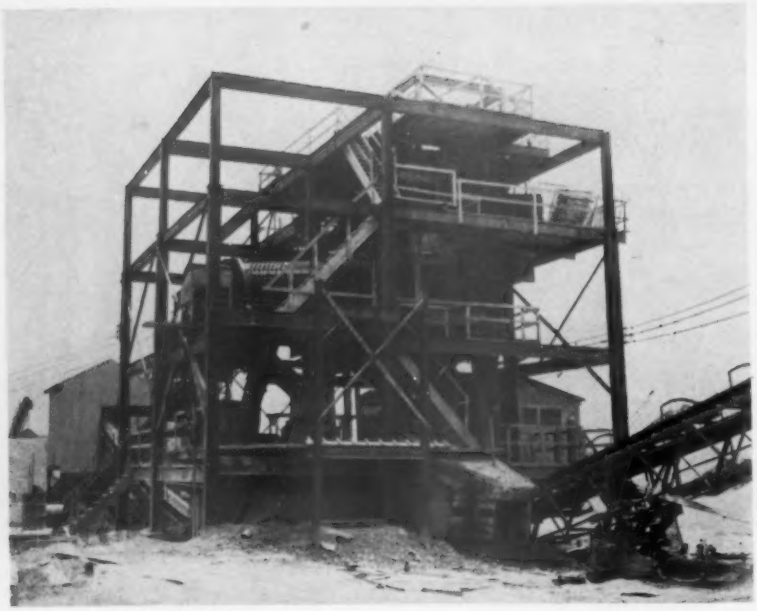
screens and bucket elevators, and a primary crusher was installed. In 1951 J. Henry Law succeeded Mr. Neville as general manager of the company. No further processing changes were made until 1952, when a complete modernization and expansion program was begun under his direction. Two 15-ft. diameter rotary coarse sand classifiers were then installed. Shortly afterward a third classifier was added for fine sand. This greatly increased the output of desirable 50- and 100-mesh fines.

Early in 1959 two 7- by 32-ft. heavy-duty log washers and three vibrating screens were added, increasing plant capacity from 300 to 425 t.p.h. and eliminating most of the soft deleterious material. In the crusher house belt conveyors replaced bucket elevators.

A major forward step in material handling was made in 1935, when a 20,000-ton (10,000 tons live) raw material surge stockpile with a reclaiming tunnel was put in, making the plant and pit relatively independent of each other. In 1959 the addition of vibrating feeders in this tunnel increased the throughput from 375 to 425 t.p.h. The first finished product stockpiling and reclaiming system, installed in 1957, provided for storage of 60,000 tons of three sizes of sand and live reclamation of 15,000 tons.

Early in 1958 a stockpiling and reclaiming system was provided for four grades of gravel—four 20,000-ton stockpiles (8,000 tons live) over individual tunnels for truck loading. Early in 1959 the bucket elevator in the crusher department was replaced by three belt conveyors. Just completed is a stockpiling and reclaiming system for pea gravel.

The source of material for this plant is one of the many glacial and alluvial deposits found along the Wabash River. It is well graded and averages 60 percent sand and 40 percent gravel. About 5 percent of the gravel is over 3 in. in size, and there are some boulders up to 36



Above: The scalping and crushing department, showing the revolving scrubber screen and crushers. Note the raw surge stockpile in the background.

Left: The two 7- by 32-ft. heavy-duty log washers in the screening and preparation building.

Scalping and crushing facilities are in the foreground in this view of the main plant. At the left is the sand storage, with automated reclamation of concrete sand to a truck-loading bin.

in. in diameter. There is enough material at this location for 10 years' operation of the plant, and another deposit close by has enough for 25 more years.

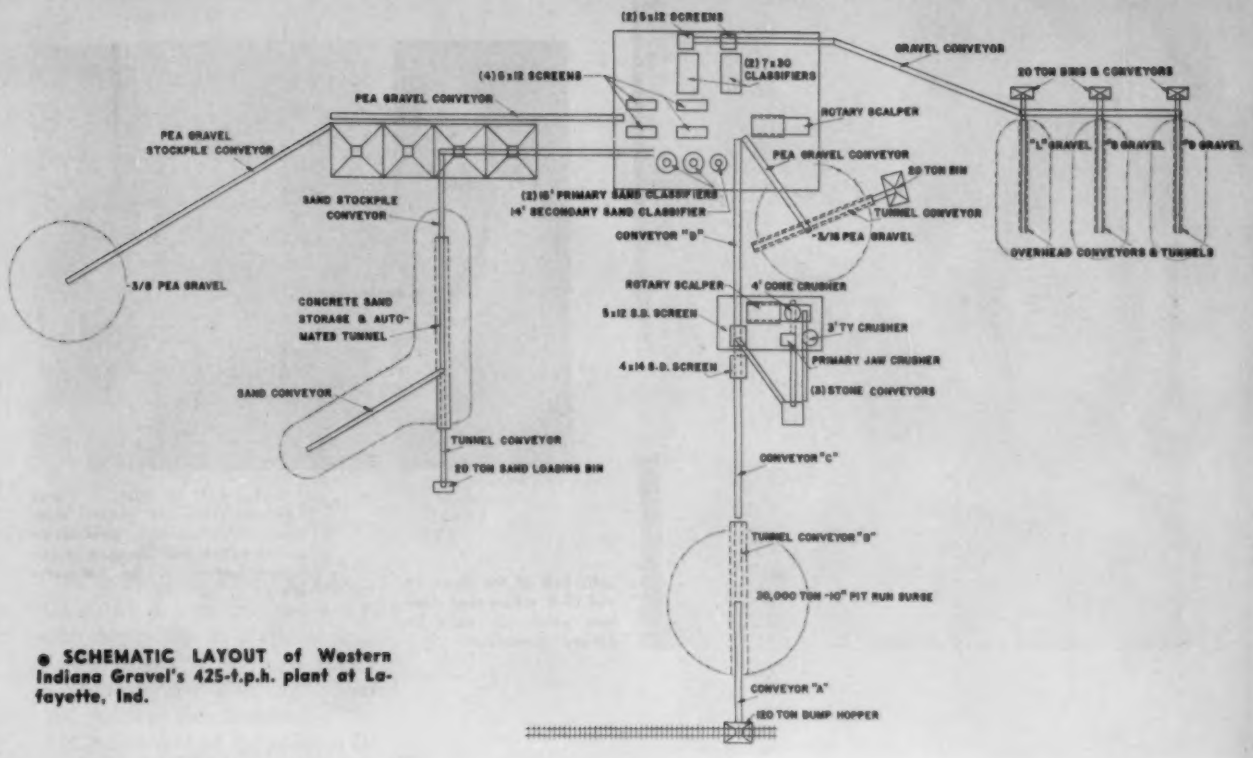
A new Lima 2400 electric crawler dragline with a 130-ft. boom and a 6-cu. yd. Page bucket loads the material into a 120-ton portable field hopper with a 10-in. sloping rail grizzly. The dragline is used to move the hopper as operations progress. Two 50-ton hopper cars and a 45-ton G-E diesel-electric locomotive haul an average of about ½ mile to the plant hopper.

At the plant, the minus 10-in. material is discharged from the cars into a 120-ton track hopper. A 42- by 84-in. Jeffrey vibrating feeder discharges this material at the rate of 400 t.p.h. on the 30-in. by 237-ft. main belt conveyor (A) to the raw surge stockpile. The latter has a capacity of 20,000 tons, of which about 10,000 tons is live storage reclaimable without rehandling. Usually two or three of the four Jeffrey vibrating feeders are used to feed at a rate up to 425 t.p.h. on the 36-in. by 234-ft. reclaiming belt conveyor (B) in the 84- by 72-in. tunnel under the pile.

A 30-in. by 393-ft. conveyor (C) feeds to the scalping and crushing department, which consists of a 48-in. by 22-ft. Webster revolving scrubber screen with a 69-in. by 12-ft. outer jacket, an 18- by 30-in. Pioneer jaw crusher, a 4-ft. Symons cone crusher, a 3-ft. Traylor TY crusher, a 4- by 14-ft. screen, two 4- by 12-ft. Simplicity screens, and three 24-in. by 125-ft. belt conveyors. The gravel is reduced to 2¼-in. or less, as required.

A wired switch at the crusher building enables the operator to start or stop any of the four reclaiming feeders as desired. There is a recording ammeter for the reclaiming tunnel conveyor from these feeders. When the amperage drops appreciably, the operator knows that a feeder is choked by large rock and he shuts the conveyor down and clears the feeder. Formerly, an extra man was needed in the tunnel. It is in this department that the capacity of the entire plant is determined.

A second man in a control tower at the processing building supervises



● SCHEMATIC LAYOUT of Western Indiana Gravel's 425-t.p.h. plant at Lafayette, Ind.

the flow of material in the plant and the distribution to the various storage areas. Horn signals are used between the various departments.

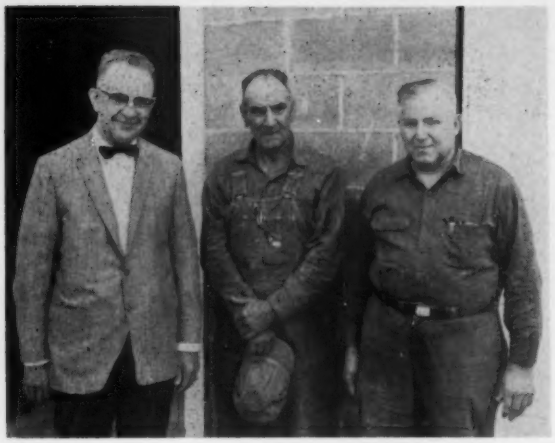
A 30-in. by 325-ft. inclined belt conveyor feeds all the minus 2¼-in. material to the screening and preparation building. The equipment in this building includes a 60-in. by 20-ft. revolving scalping screen, two 7- by 30-ft. Eagle Iron Works heavy-duty log washers, five 5- by 12-ft. Seco vibrating screens, a 5- by 12-ft. Link-Belt screen, and three 15-ft. and 14-ft. diameter rotary sand classifiers.

These classifiers are on three different levels. The lower two handle coarse sand, and their overflow is pumped from a sump to the top (fine-sand) classifier. This equipment is so arranged that any desired sizes or combinations can be made. These products can be stored in 150-ton plant bins for car loading, or they can be put in the three stockpile storage systems for gravel, pea gravel or sand.

Four sizes of gravel now go to stockpile storage: 1¼- to 3/16-in. "L" gravel; 1- to 3/16-in. No. 8; ¾- to 3/16-in. No. 9; and 5/16- to 0-in. No. 5 pea gravel mix. The first three of these materials go to a 24-in. by 310-ft. belt conveyor. Near the feed end of the conveyor there is a control room from which the various gates directing the further flow are operated. This conveyor can discharge direct to the first stockpile, on the first of two

Gravel being loaded out from one of the automated reclaiming systems. The truck driver pushes a button to control loading; the bin is automatically refilled.

Left: Two of the three 14- and 15-ft. rotary sand classifiers which can make any desired gradations.



(Above) Left to right: J. Henry Law, secretary and general manager; John Connors, general superintendent; and Clarence Snider, superintendent of the Lafayette plant.

24-in. by 148-ft. storage conveyors or to the first of three 24-in. by 69-ft. stockpiling conveyors at right angles to them. The first storage conveyor also discharges three ways—direct to the stockpile, to the second stockpiling conveyor, or to the second storage conveyor.

The second storage conveyor discharges two ways—direct to a stockpile or to the third stockpiling conveyor. There is a stone ladder at each of the six stockpile discharge points to minimize segregation in the piles.

With this arrangement, there are three double stockpiles, one under each of the three transfer points and its stockpiling conveyor. Each has a capacity of 20,000 tons, of which 8,000 tons is live storage without rehandling. There is a reclaiming tunnel under each of the four stockpiles, and each 24-in. by 199-ft. reclaiming conveyor is fed through six gates which are pre-set for the desired capacity.

Each of the three conveyors discharges to a 20-ton truck-loading bin, which is equipped with upper and lower level Bin-Dicators. A truck pulls up under a bin for loading, and the driver pushes a button which opens the bin gate. As the truck is being loaded, the upper level Bin-Dicator automatically starts up the reclaiming conveyor. The truck driver pushes a button to close the bin gate when his truck is full, and the upper level Bin-Dicator stops the conveyor when the bin is full. With this arrangement a truck can be loaded at each bin every 5 minutes. All belt conveyors in this department are Barber-Greene.

A separate single system is used to store the 5/16-in. down to No. 5 pea gravel mix. A 24-in. by 200-ft. conveyor discharges on a fourth stockpile. A 24-in. by 199-ft. tunnel conveyor feeds to a fourth 20-ton bin with the same truck-loading arrangement as the other three.

In the new pea gravel stockpiling system the ⅜- to 1/10-in. No. 12 gravel is discharged from a 5- by 12-ft. Seco screen in the processing building onto a 24-in. by 80-ft. conveyor to a 24-in. by 500-ft. stockpiling belt. The latter discharges to a 15,000-ton ground stockpile at three points *via* stone ladders. This material is loaded into trucks or cars *via* Michigan 175A front-end loaders.

In the sand stockpiling system three grades are stored: No. 3 plaster sand, No. 4 or concrete sand, and No. 17 or blacktop. The sand is transported from sand classifiers in the processing building on an inclined belt conveyor, which can discharge either into a 3-compartment, 400-ton truck- or car-loading bin, or on a 24-in. by 291-ft. horizontal conveyor. The latter has scrapers arranged so it can discharge at six intermediate points, or at its end, to a stockpile. This conveyor can also deliver to a 24-in. by 100-ft. conveyor, which can discharge at its end and an intermediate point to the same row of stockpiles. These stockpiles have a total capacity of 60,000 tons without rehandling, of which about 15,000 tons is live storage.

Usually only concrete sand is reclaimed on the 30-in. by 275-ft. tunnel reclaiming conveyor, and this material goes to a 20-ton truck-loading bin, which is identical with the gravel loading bins, having Bin-Dicators, automatic control, etc. The other two grades of sand are difficult to control when they are too damp; so they are usually rehandled direct from piles to trucks by bulldozers and cranes.

Officers of Western Indiana Gravel include Horace Gunn, president; M. A. Neville, vice-president; J. H. Law, secretary and general manager; and Joe Bookwalter, treasurer. John Connors is superintendent, and Clarence Snider is superintendent of the Lafayette plant.

Loading Speeded at Ideal Plant With "World's Largest" Scales

THE NEW Ideal Cement Company plant in Devil's Slide, Utah, loads 400-bbl. capacity railroad cars in 20 minutes, 30-ton-capacity trucks in eight minutes. The loading rate for the entire plant is well over 3,000 bbl. an hour, or roughly 564 tons.

This bulk loading sytem, a part of Ideal's new $2,000,000 cement storage and loading facilities, achieves this rapid loading with three large combination motor truck and railroad track scales, reportedly the world's largest, which are linked to semi-automatic weighing controls. The entire weighing system was manufactured and installed by the Howe Scale Company.

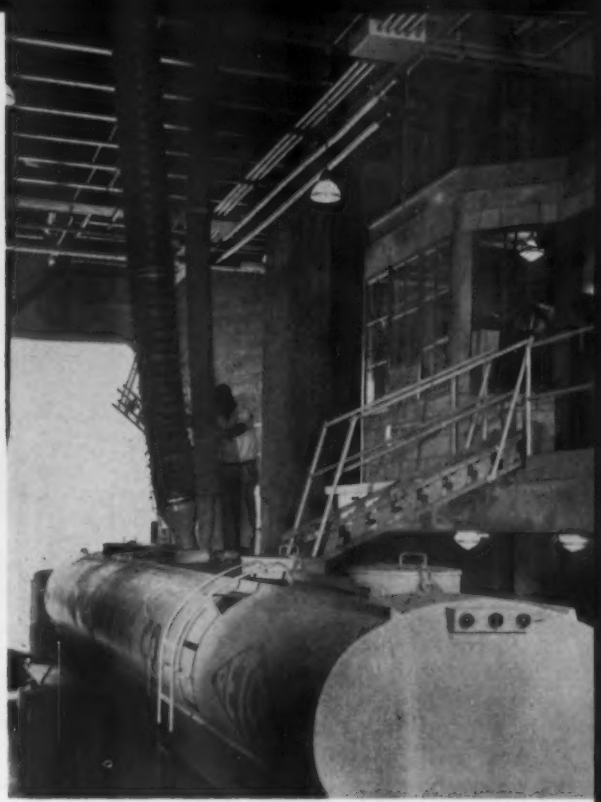
With this system, trucks and railroad cars are loaded and weighed interchangeably on the same scales. Three trucks or railroad cars, or a combination of both, can be loaded and weighed simultaneously.

Construction of the original Devil's Slide plant (then the Union Portland Cement Company) began in 1904. The productive capacity of the plant in 1907, the year the first shipment left the plant, was approximately 1,500 bbl. a day, less than 500,000 bbl. a year. This plant became a part of Ideal Cement Company in 1908 and was operated with existing facilities up through World War II.

After World War II Ideal's vigorous program resulted in the construction of a new plant, which went into production in 1948. The productive capacity of this plant is 1,850,000 bbl. of cement a year, a capacity which created the need for additional storage facilities.

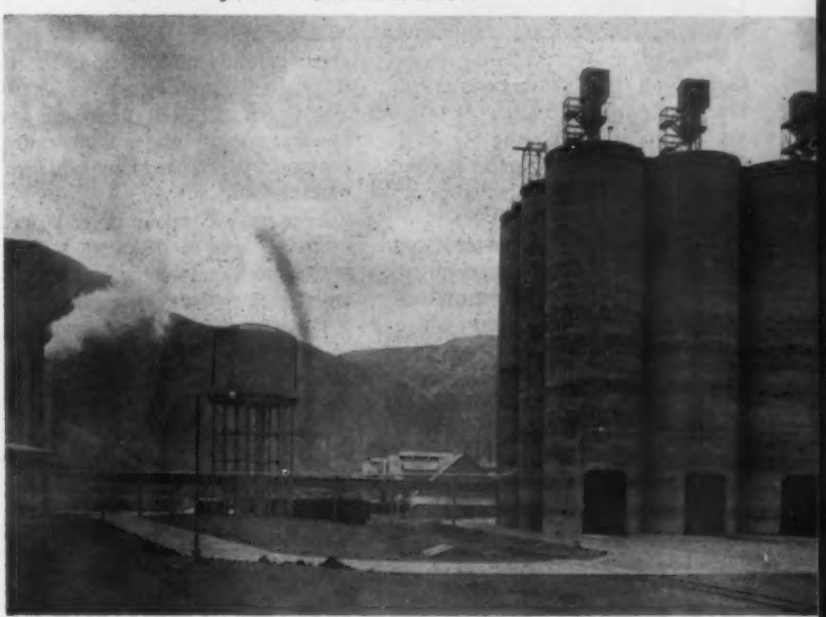
Faced with this large productive capacity, the top management team of Ideal decided to update the Devil's Slide plant with new storage and bulk-loading facilities. They made this decision for two reasons. With greater storage facilities, Ideal could provide steadier employment during the winter months, when construction activity is slow. Moreover, these facilities would assure that ample cement would be available for immediate delivery during the summer, when construction activity is at its peak. The new weighing system insures rapid loading of the cement into railroad cars and trucks.

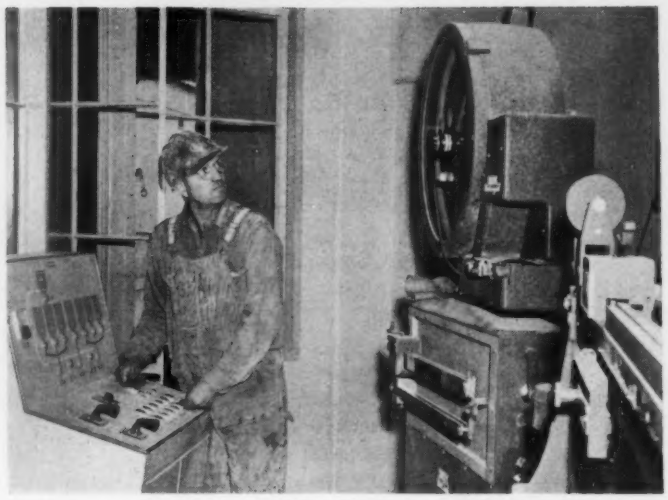
(*Please turn page*)



This bulk cement truck rests on a 7-section, 150-ton capacity Howe scale, as the cement is gravity-fed into the truck. The dust collection systems keep the loading area free of dust.

Nine cement storage silos tower over the Ideal Cement Company plant in Devil's Slide, Utah. Each of the silos, 140 ft. high, holds 18,000 bbl. of cement.





The operator pushes the start button and watches loading progress on the dial scale. The weighing system controls the flow of cement into trucks and railroad cars up to the maximum gross load weight allowance, which is pre-set on the scale's dial cut-off.

The new storage facilities consist of nine concrete silos, each 36 ft. in diameter and 140 ft. high, combined with four interstice bins, for a total storage capacity of 202,000 bbl. of cement. These new facilities, added to those already existing, provide an over-all storage capacity of 460,000 bbl. of cement —almost one-fourth of the plant's annual productive capacity. Finished cement is pumped by Fuller-Kinyon pumps directly to these silos from the plant's air separators, the final stage in cement production.

Three Howe combination motor truck and railroad track scales service the nine silos. Each scale, servicing three silos, is 170 ft. long and 10 ft. wide, and has a 150-ton gross capacity. Dual weight indication and weight recording are provided for each scale—a 150-ton recording beam for weighing railroad cars, a 50-ton dial and printer for weighing motor trucks.

Semi-automatic controls handle loading of the cement into the railroad cars and trucks. Besides rapidly loading the cement, these cutoff controls eliminate the possibility of overloading, a danger always present with manual controls.

To start the loading operation, a truck or railroad car is positioned beneath the appropriate silo, with the silo's loading gate inserted in the loading port of the truck or railroad car. An operator in the control room then sets the scale's dial cutoff to the maximum gross load weight allowable for the truck or railroad car—and then pushes the start button.

The Howe system automatically "flows" cement at the rate of over 1,000 bbl. per hour until the preset weight is reached; then it cuts off the flow. The total loading time is 20 to 25 minutes for a railroad car or about 8 minutes for a 30-ton capacity truck.

Consolidated Feldspar

(*Continued from page* 95)

ment, from the jaw and cone crushers in the mill, and from the milling circuits is handled by Sly Roll-Clean Dynaclones. In each case, the dust is returned to the appropriate circuit.

The entire milling department and the product distribution system are regulated from a central control center above the main mill floor, which houses G-E controls and switchgear. Electric power for the operation is purchased and delivered to the various milling phases at 440 v.

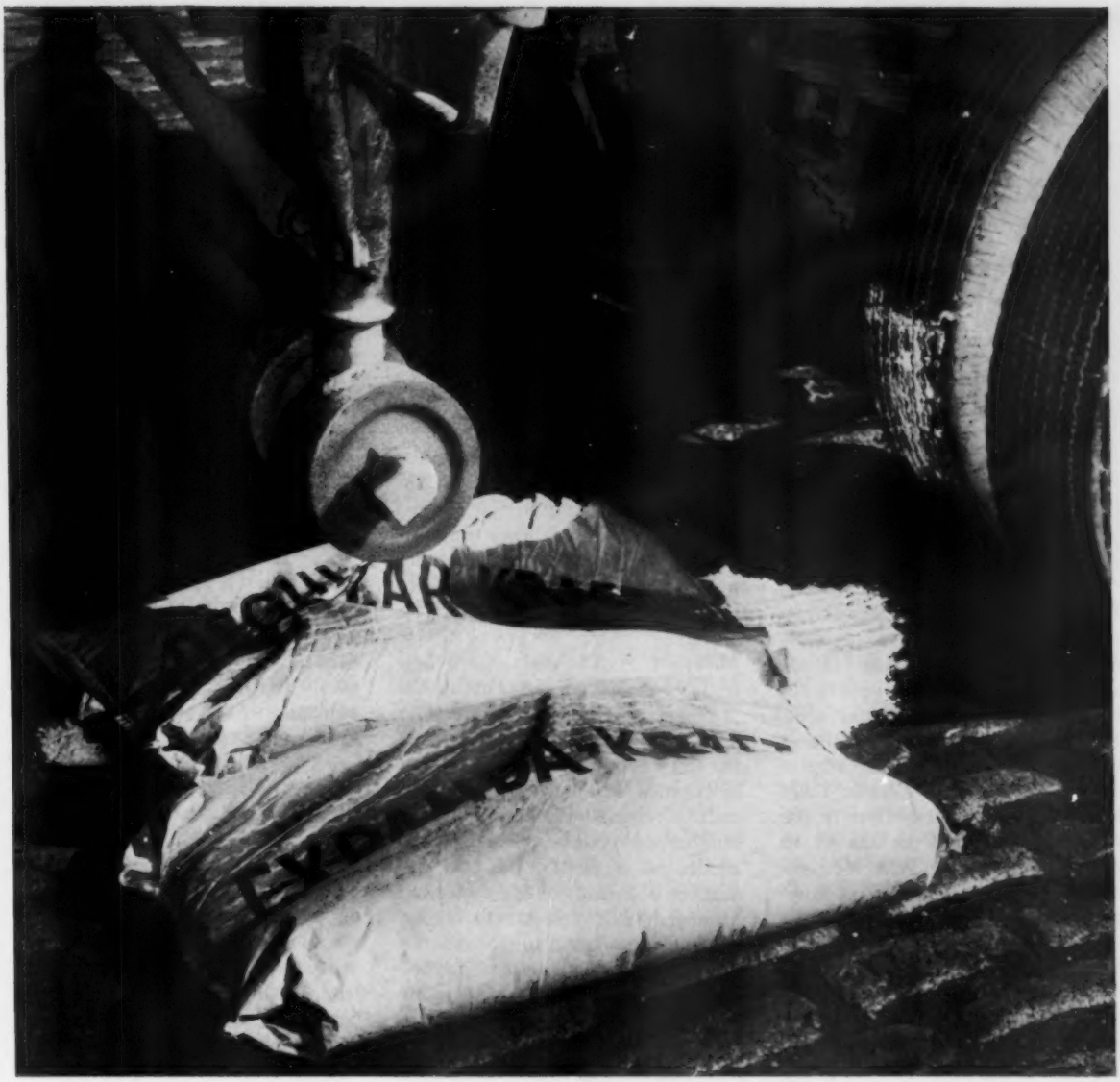
Normal operations require, per shift, only two men in the mill, a mechanic, and two men on loading. Routine production involves three mill shifts on a 5-day week.

As a necessary and critical adjunct to the modernized milling installation, quality control has been given careful consideration. In addition to the routine and occasionally special checks of quarry-run ore noted previously, the mill laboratory personnel carry out many other important tests.

Samples are taken of mill feed every 2 hours to make up a composite check on material entering the mills over a 2-day period. These, plus tests of quarry-run material, are chemical determinations. The latter, along with physical (grind) checks are made on 24-hour composites of samples taken every 2 hours on mill discharge, and loading distribution lines. Samples of every customer's shipment, either bulk, or bag, are also taken and analysed. Thus, complete chemical and physical analysis data is available for every shipment made. Small portions of the samples from which the customer analysis was made are kept on file for at least three months for possible reference.

To assist and expedite the laboratory program, a Perkin-Elmer flame photometer was installed. This has not only tripled the former speed of determination of alkali content, but has contributed to greater accuracy. Also, there is no longer a need for expensive platinum cups and uranium acetate for these determinations.

Heading Consolidated Feldspar's modernized Custer operation is A. E. Boone, plant superintendent. Other key personnel include Irven Green, mine foreman; Delbert McKenna, mill foreman; Fred Miller, head of the laboratory; and Harold Leigh, office manager.



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Agstone Requirements Object of Long Search

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An appraisal of test methods in agronomists' efforts

By ROBERT M. KOCH
President, National Limestone Institute, Inc.

THE accompanying article *(Lime Deficiency Determination Improved by New Soil Test,* opposite page) exemplifies the continuing efforts made by American agronomists to find the optimum method for determining how much agricultural limestone is needed for the proper treatment of our soils. Ever since the land grant colleges were established during the administration of President Lincoln, there has been a concerted effort in the humid area to find the answer to this most restrictive factor for optimum production—acid soils and/or calcium-magnesium shortage.

Soil Deficiency According to the original studies, it became apparent that the exploitation of soils that once were very productive had created a deficiency of several million tons of agricultural liming materials. At no time in our nation's development have we ever come close to returning to the soil each year anything like the amount of calcium and magnesium carbonates lost through plant uptake, leaching, and erosion.

At first, American scientists, told us this deficiency was a few million tons; and now authorities tell us that 80 million tons a year will be required for a number of years before we can even approach optimum growing conditions. According to the National Limestone Institute's survey for 1959, the last year for which figures are available, only 22.7 million tons were used in that year on the nation's soil. These needs have been determined by the so-called conventional tests.

Ohio Test The new Ohio test, according to the authors of the accompanying article, show that substantially heavier applications of agricultural limestone are needed to correct the deficiencies their test is indicating.

Missouri Method A few years ago a new method of evaluating the agricultural limestone needs of the soil was announced by the University of Missouri. This test determined the number of pounds of calcium required as a plant food, the number of pounds of magnesium needed as a plant food, and the number of pounds of either calcium or magnesium (in calcium carbonate equivalent) needed to correct the acidity (pH). This system further provided that after the pounds of effective calcium and the pounds of effective magnesium had been determined, the figures were translated into the necessary tons of agricultural limestone from a table showing the effectiveness of varying limestones according to calcium carbonate content and relative fineness.

Gilbaly and Axley Method The Gilbaly and Axley method of rating agricultural limestone is under consideration by a group of agronomists in the East. This new chemical evaluation consists of boiling limestone samples with EDTA (ethylene diamine-tetraacetate) for 20 minutes. This method was devised to give a more accurate laboratory measure of correlated field results for predicting crop responses.

To date, the correlation of the EDTA analysis and the resultant pot tests were very high, with the exception of some discrimination against dolomitic limestone. This method of evaluating agricultural liming material is being given further study both in the laboratory and through field tests. This last method has not as yet been put into practice. The Ohio method is being practiced in Ohio on a voluntary basis, and the Missouri test is now mandatory in that state for those applying for aid under the Agricultural Conservation Program.

Review Needed It seems that a review of the present tests in effect throughout the United States by the layman and certainly by the individual farmer, who is so directly affected, must certainly raise the question whether we have yet arrived at a point where any of these tests — which under our practical conditions can never be more than guides—should be made mandatory. And yet, 17 states require that if farmers are to receive federal assistance—which now ranges from 25 percent to 75 percent of the cost of liming material delivered and spread on the fields—there must be a mandatory soil test before a farmer is eligible for ACP assistance.

No one can question the logic of having a soil test in order *to be sure* of the agricultural limestone needs of the soil before determining the rate of application. However, the theory of soil testing is open to serious question when so many different tests are advocated by American scientists. Moreover, testing loses considerable stature when so little scientific correlation is found between the soil tests, the prescribed application of liming material, and the resulting field production results.

Lime Deficiency Determination Improved By New Soil Test

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Soluble aluminum factor studied

By E. O. McLEAN
Professor of Agronomy
Ohio State University
and
H. E. SHOEMAKER
Extension Agronomist
Ohio State University

THE new soil test for lime deficit is better than the old. A new soil test has been developed for determining the lime deficit in Ohio soils. When the old test was used on soils high in soluble aluminum, the need was indicated for much less lime than laboratory and field studies showed was required to neutralize the acidity. The new test indicates much more accurately the correct amount of lime required by an acid soil, regardless of the level of soluble aluminum it contains.

The new test is rapid as well as more accurate. Like the old test, the new one is a rapid laboratory test based on the amount of change in pH of a given amount of buffer by a given amount of soil. However, the new test makes use of a more dilute buffer mixture and a combination of buffers which gives a more nearly linear relationship with both hydrogen and aluminum acidity through a greater range than did the old buffer. This test is designed for use in the laboratory which handles thousands of soil samples annually. More than 50,000 samples have been tested by this method in the Ohio State University Soil testing laboratory during the last 11 months. A group of 44 samples of soil are simultaneously shaken with the buffer for 10 minutes on a time-clock regulated shaker. The amount of change in pH of the buffer caused by the acid in the soil is an indication of the amount of lime required.

The amount of soluble aluminum in soils increases with soil acidity. More than 8 percent of the earth's crust is aluminum. Since it is found in almost all soil particles, rocks, and minerals, its total amount varies relatively little from one area to another. Most of it is associated with other elements such as silicon and oxygen. In this form aluminum is insoluble and harmless to plants.

However, with increasing acidity of soil, aluminum dissolves; and when it is present in soluble form in sufficient quantity, it is very toxic to most plants growing in these soils. In addition, this form of aluminum reacts with soluble phosphates to form less soluble aluminum phosphates which eventually become very unavailable to plants. Aluminum is generally not a serious problem in soils except in those which are very acid. Such soils are common in eastern Ohio.

The aluminum problem is both old and new. This condition of soluble aluminum in soils is not something that has just recently developed, but only recently has the extent of the problem been fully recognized. Aluminum toxicity to plants in acid soils was recognized more than three-quarters of a century ago. Nearly 50 years ago much work was done which showed the importance of soluble aluminum in acid soils, including its toxic effects on plants and its adverse effects on phosphates of the soil.

Even at that time it was demonstrated that *adequate* liming of acid soils essentially eliminated the soluble aluminum problem. As long as the rate of lime application was determined by actual crop response to varying amounts of lime applied in the field, liming solved the problem.

However, with the development of the rapid laboratory test for lime requirement, the problem was inadvertently revived. The rapid test was necessary for routine determination of the lime deficit of large numbers of acid soils, and it served well for those soils low in soluble aluminum.

As mentioned above, it soon became evident that the widely used rapid test underestimated the amount of lime needed for soils high in soluble aluminum. In fact, this aluminum requires *additional* lime for neutralization, yet the (old) test indicated *less* lime was needed than on soils of similar acidity but low in soluble aluminum.

The answer to the soluble aluminum problem lies in adequate liming. Not all states have come to grips with the problem of adequacy of soil testing as a basis for lime recommendations on very acid soils, but workers in many states have recognized that for at least some soils the old test required much adjustment to qualify as a basis for recommending lime.

Research in Ohio has shown that actual lime requirements of acid soils of equal pH may vary threefold. Thus there was need for a rapid soil test which would satisfactorily indicate the amounts of lime required to bring soils to a given pH.

Preliminary studies have also shown that the optimum pH for plant growth differs with the initial level of soluble Al, as well as with crop species. There is evident need now for determining the pH level to which different soils should be limed for optimum plant growth.

Although a soil which is high in soluble aluminum may not need to be limed to the same pH as another, it appears that more lime is needed than the old test indicated. It can also be said that whether the new soil test or some other acceptable method is used to determine the amount of lime to apply, the solution to the soluble aluminum problem still lies in adequacy of liming.

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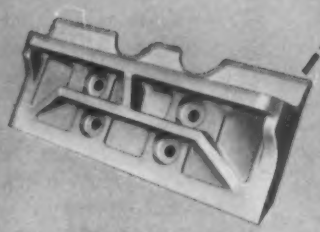
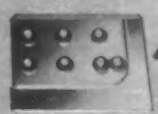
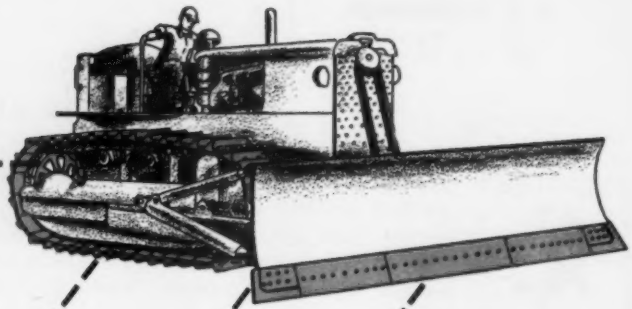


TRACTOR PADS



END BITS

DOZER BLADES



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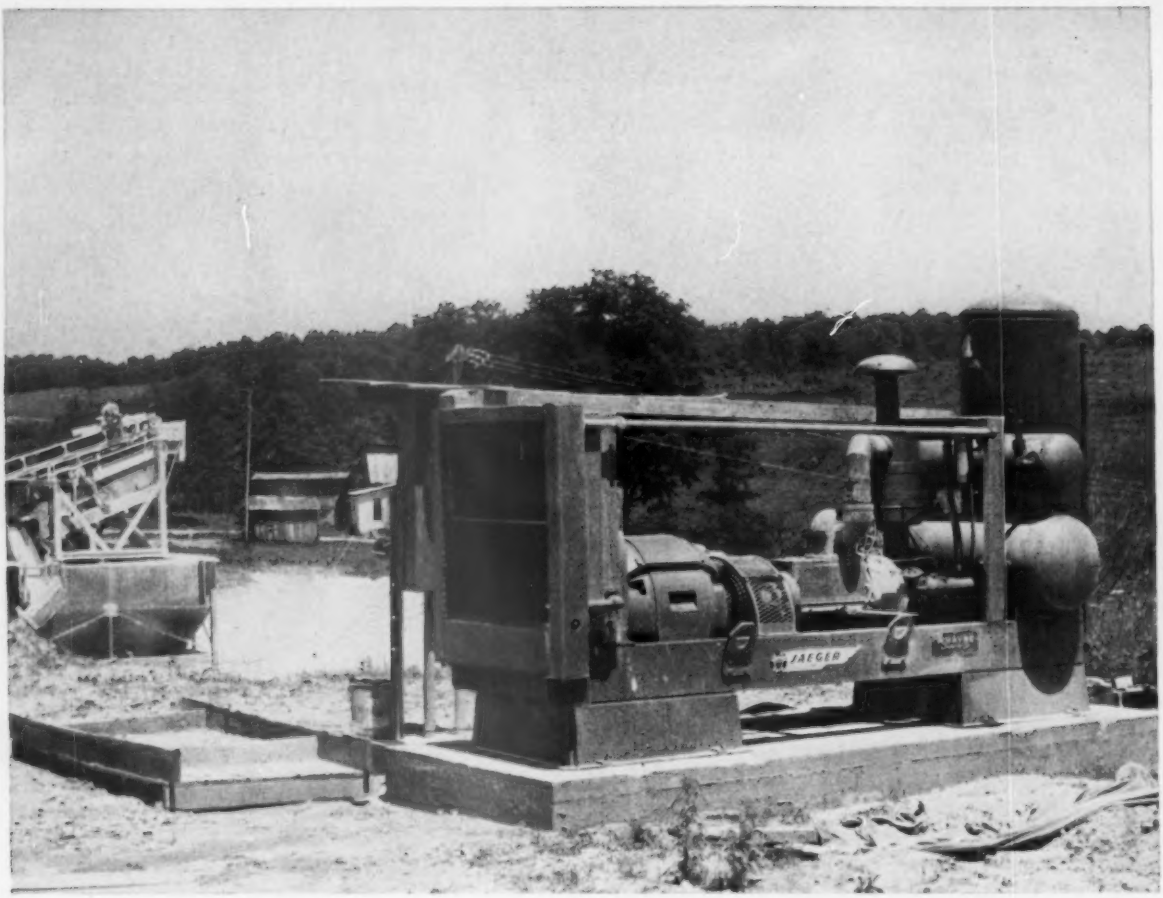

This motor-driven compressor is *paying for itself* with what it saves in maintenance costs. Photo taken before unit was housed.

Jaeger Announces an Advanced Electric Rotary Compressor for Quarries

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The 2-stage sliding-vane type rotary compressor runs as smoothly as its electric motor. Air delivery is continuous, without intermittency or pulsation. There are no valves or pistons. It weighs 30% less than reciprocating compressors and delivers 100° cooler air.

Available with or without motor, in 30, 60, 100, 150 hp models of 130, 260, 380 and 625 cfm air capacity, 100 psi pressure. For specifications and prices, call your Jaeger distributor or write for additional information.

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Utah operator adds new unit for road-base product

Separate Plant
Produces Special Material

By HARRY F. UTLEY

ANOTHER ON THE SPOT report

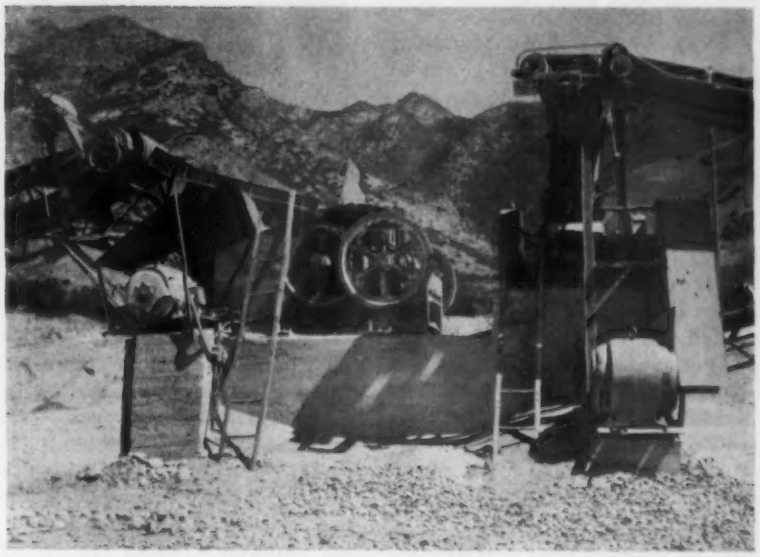
ONE of the fairly recent entrants into the aggregates business in Salt Lake City is the Harper-Jackson Sand & Gravel Company. Its pits, a few miles southeast of the Utah capital, are located in the old Bonneville lake-bed formation which is reputedly one of the cleanest, soundest, and best-graded deposits in the country.

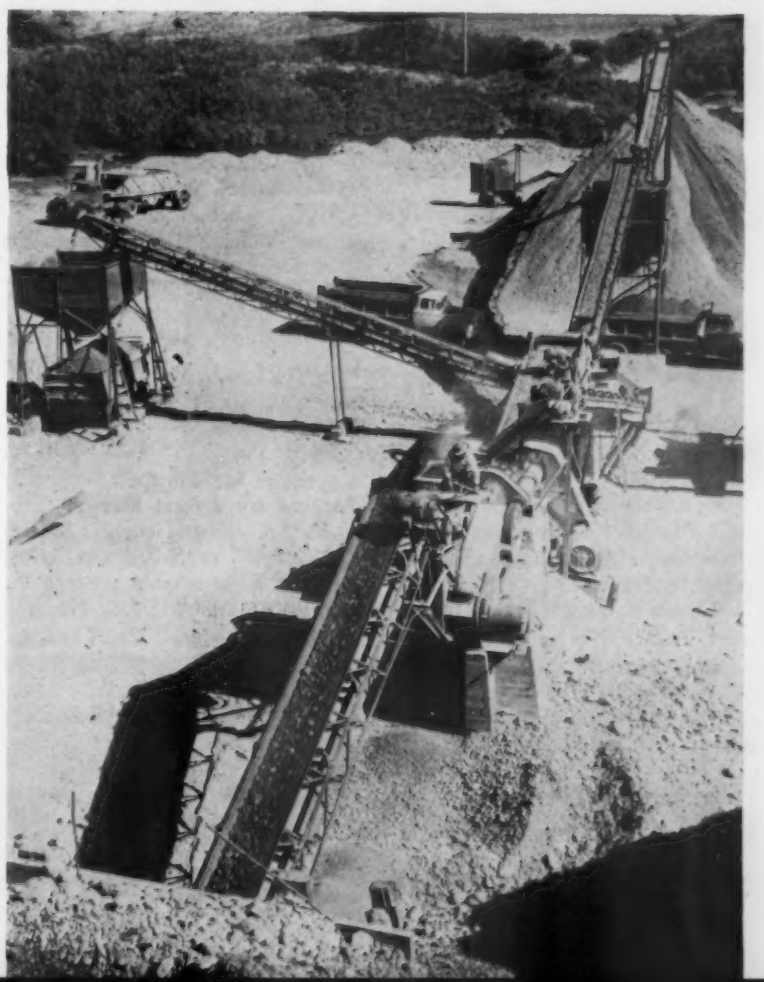
The company's first plant, a wet operation turning out washed, sized, and crushed concrete aggregates, was erected in 1956. Cedarapids machinery is used throughout except for the manufacture of sand, which is handled by a Wemco 42-in. sand-preparation spiral. The capacity of this plant is 150 t.p.h.

The latest development of Harper-Jackson, production-wise, is a separate plant nearby which is devoted almost exclusively to turning out specification road-base material. Output runs about 200 t.p.h. It is a simple, straight-line operation, its distinctive feature perhaps being the use of prefabricated belt-conveyor sections which are interchangeable for the most part, and the electric motors which were all furnished by the same supplier.

Excavating and hopper-loading is done by a Caterpillar D8 tractor-bulldozer, and a vibratory feeder puts the pit-run onto a 30-in. belt conveyor running to the plant. When the plant was visited, about 200 lineal feet of conveyor was being used, but this distance can be increased or decreased as required,

Below: The scalping screen and the twin-jaw primary crusher are at the left in this view. Also shown is the roll crusher (right).





Right: An over-all view of the road-base material plant of Harper-Jackson Sand & Gravel Company, Salt Lake City. The conveyor running at right angles delivers 1-in. drainage rock to the truck-loading bin (left).

The road-base bin and conveyor which carries surplus to open storage. All conveyor sections and electric motors in the plant are identical to permit interchanging units.

depending upon which portion of the extensive pit is being worked by the tractor-dozer.

A 3- by 6-ft. Kolman scalping screen rejects plus 2-in. gravel to a Cedarapids 12- by 36-in. twin-jaw crusher, mounted alongside the screen at ground level. Crusher product then passes by a short belt conveyor to a 4- by 12-ft. double-deck Cedarapids sizing screen. This screen is fitted with a 1¼-in. mesh on the top deck and 1-in. on the bottom, oversize being closed-circuited with a pair of 22- by 35-in. corrugated Cedarapids rolls for further reduction to minus ½-in. size.

Minus 1-in. screen throughs constitute road-base material and account for more than 75 percent of the plant's output. This product is carried by a belt conveyor to a 90-ton capacity truck-loading bin. When the bin is full, still another conveyor carries the surplus along to a stockpile. A Michigan 175A front-end scoop loader is used to serve the trucks which load at the pile.

Material within the very close limits of plus 1 in. 1¼ in. (retained on the lower deck of the sizing screen) is known locally as "drainage rock" and is sold for this purpose primarily to sewer contractors in the Salt Lake City area.

A separate belt conveyor carries the drainage rock to a 30-ton truck-loading bin. This conveyor, incidentally, is the only one in the entire plant that is not in the straight-line production layout, as one of the accompanying pictures indicates.

All plant controls are centralized on a board at ground level near the crushers and each has a padlocked cover to prevent tampering. All the conveyors and other equipment are sequence-interlocked.

The various Barber-Greene conveyors, as well as the feeders, crushers, and screens, are powered by Brook motors. The 11 units are identical except for size, the smallest (10 hp.) on the conveyors, and the largest (100 hp.) driving the roll crusher. According to the management, the interchangeability of motors, motor parts, and the use of standard mounting bases has greatly simplified maintenance and cut costs at the same time. Three Brook motors are also in service at the washed-aggregates plant, and the remaining drives are gradually being replaced with these power units.

Edward B. Harper is president, and Lloyd Jackson is vice-president and general manager of the Harper-Jackson Sand & Gravel Co. John Harkness is superintendent of both plants.

Radford Limestone Co. Sold To N. Y. Aggregates Firm

Radford Limestone Co., Inc., New York, N.Y., operated by Appalachian Power Company since 1939, has been sold to B. R. deWitt, Inc., Pavilion, N.Y., for an undisclosed sum. DeWitt produces sand, gravel, and crushed gravel.

The sale includes the plant, equipment, and 100 acres of limestone reserve. Average annual production has been about 350,000 tons of crushed limestone and sand. The quarry site is located about four miles south of Radford, Va. No changes in management or operating personnel are planned. However, the firm will now be known as the Radford Limestone Corp.

Carthage Marble Co. Formed by 2-Firm Merger

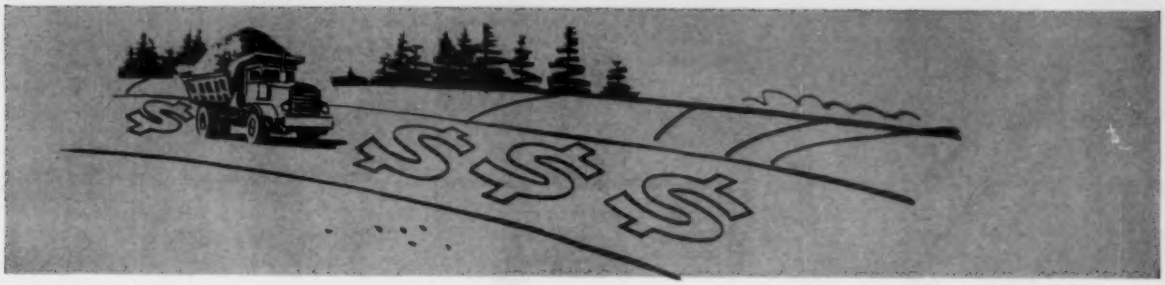
The Carthage-Georgia Marble Co., a newly organized firm, is the result of a partnership between the Georgia Marble Co., Tate, Ga., and the Carthage Marble Co., Carthage, Mo. Each company will retain its separate corporate structure. Headquarters will be in San Francisco.

The new company has purchased the Dondero Marble Co., San Francisco, and the Premier Marble and Tile Co., South Pasadena.

New Canadian Aggregate Plant Has 1,000,000 T.P.Y. Output

Evans, Coleman and Evans Limited, Vancouver, B.C., has opened a new aggregate plant at Mary Hill, 23 miles east of the city at a cost of $1,700,000. The plant is said to be one of the five largest in Canada, having a capacity of 1,000,000 cu. yd. annually.

The plant equipment includes a fleet of 70 scows and nine tugs which deliver aggregate to users throughout the lower mainland and coastal areas. Crushing, scrubbing, and loading operations are fully automatic.



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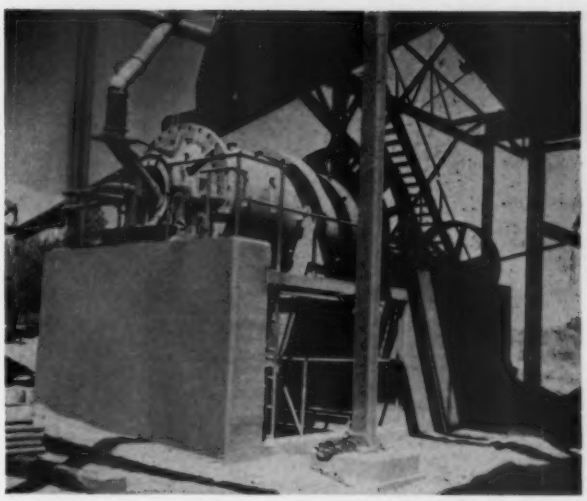

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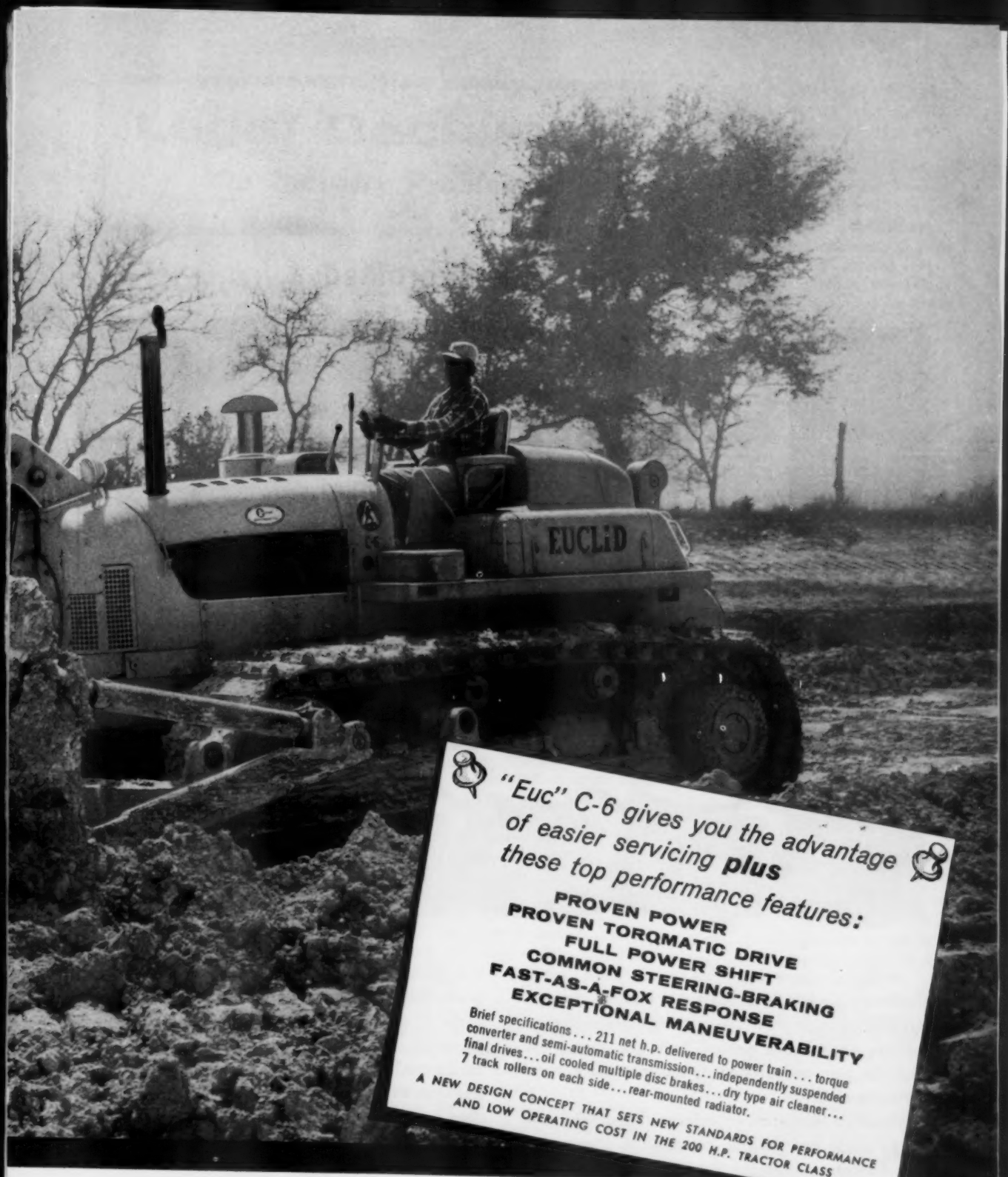

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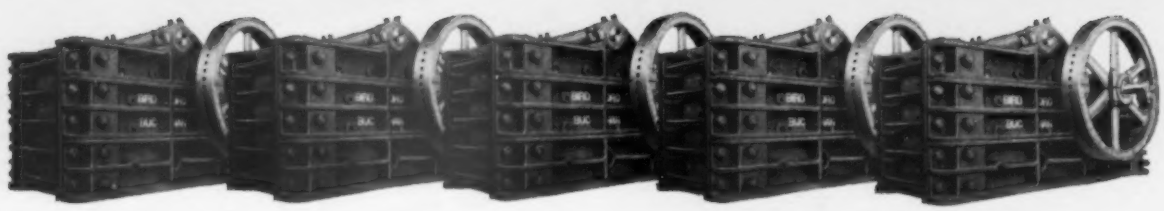

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Legal Decisions

On Industry Problems

By LEO T. PARKER
Attorney at Law
Cincinnati, Ohio

SOME TIME ago the writer attended a convention of concrete products manufacturers, and considerable discussion arose over the correct answer to an important legal question, as follows: "If an employer appropriates or borrows an employee from another employer and this employee negligently affects an injury, which employer is liable in damages to the injured person?"

The importance of this legal question becomes quite apparent when it is realized that the correct answer may mean an expenditure of many thousand dollars by the liable employer.

A higher court rendered an unusually important decision which clearly answers this legal question. I shall review this decision of *Vontress* v. *Ready Mixed Concrete Company,* 104 N. W. (2d) 331, in considerable detail.

First, it is important to know that the law is well established as follows:

The fact that an employee is the general employee of one employer does not prevent him from becoming the particular employee of another employer who may become liable for negligent injuries caused by the appropriated or borrowed employee. Generally speaking, the higher courts hold that the right of control determines if the relation of master and servant, at the particular time in question, existed between the employee and his regular employer, or if there had been a change in relationship and he had become, for the time being, a special employee of another employer. In other words, an employee may be in the general service of one employer and, nevertheless, with respect to particular work, may be transferred, with his own consent or acquiescence, to the service of a third person, so that he becomes the legal employee of another employer with all the legal consequences of the new relation.

For example, let us assume that a person is regularly employed by a corporation which does not authorize this employee to perform special services for its customer. Without consent of the corporation's officials this employee agrees to perform services for the customer and be under his control temporarily. Under these circumstances the customer becomes solely liable and responsible for negligent acts of the employee who causes injuries to any person or who damages personal or private property.

In one early higher court case, for further example, an employer, named White, sent his regular employee to construct concrete steps for a customer named Hays. As the work proceeded Hays, without knowledge or authority of White, took control of the employee and directed him how to complete certain details of the construction work of building the steps. Several months later the steps collapsed and seriously injured a mother, and killed her child, who was descending the steps.

In subsequent litigation, the higher court refused to hold White liable in damages for injuries to the mother and death of the child, because the testimony clearly disclosed that the defect which caused the steps to collapse resulted directly from the improper instructions Hays had given the employee as to how reinforcement should be incorporated in the steps. This higher court held Hays liable in $32,000.00 damages.

On the other hand, a quite different situation arises when the testimony shows that an employer instructs his regular employee to perform special services for another employer who assumes no control over this employee.

For example, in the decision of *Vontress* v. *Ready Mixed Concrete Company,* the testimony showed facts, as follows: A contractor named Pane had a contract to pave Oak Street and had entered into a contract with the Ready Mixed Concrete Company to furnish concrete for the job. Pane had constructed forms on the street. The Ready Mixed Concrete Company owned a number of truck mixers. These trucks, loaded with concrete, would come to a street intersection, then back eastward on Oak Street to where the paving was being done, and there unload the concrete between the forms put up by Pane.

Pane had in his employment a man named Vontress whose duties on that job were to empty the concrete from the trucks as they delivered it, doing so by means of a chute attached to the rear thereof, and to have the truck's driver pull the strike-off bar whenever it was necessary to have this done. Vontress had been engaged in doing this type of work for Pane for some seven or eight years.

An important point brought out by testimony is that officials of the Ready Mixed Concrete Company had authorized its truck drivers to render this special service for Pane. In the performance of this work, both the unloading and pulling the strike-off bar, Vontress would signal the driver of the truck (there being only one driver to each truck) and he would operate the truck he was driving accordingly. The strike-off bar, about 25 ft. long, is used to level off the concrete when it has been filled in between the forms. The truck driver backed up so Vontress could attach the strike-off bar to the back end of the truck. Then Vontress would signal the driver to go ahead, which the driver would at about one mile an hour.

One day while a truck was being backed up by its driver it ran over Vontress' leg. The leg had to be amputated and Vontress sued the Ready Mixed Concrete Company for heavy damages.

In view of the fact that officials of the Ready Mixed Concrete Company had instructed its truck drivers

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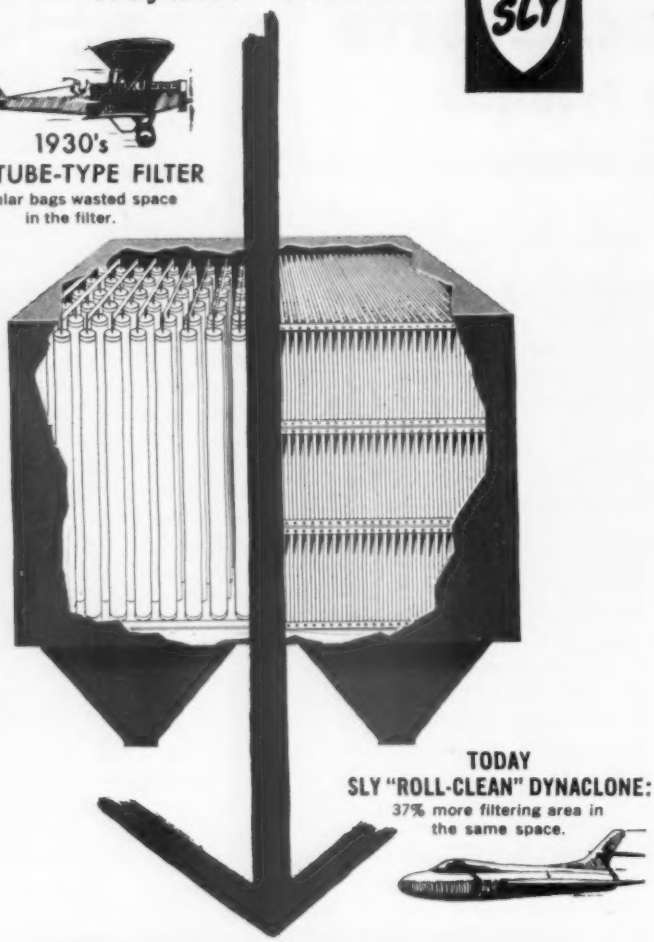

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to take orders from Vontress and, further, that neither Pane nor Vontress had assumed control over the truck drivers, the higher court held the Ready Mixed Concrete Company solely liable in damages to Vontress. This court said:

"There was no agreement, either oral or written, or any terms or arrangements between Pane and Ready Mixed whereby Pane was authorized to use the truck drivers of Ready Mixed for the purpose of pulling the strike-off bar with the trucks they were driving. It is apparent, however, that on this job Ready Mixed knew they were to be used and gave its approval so the drivers could perform the service whenever they were asked to do so by Pane. To escape liability, the original employer must resign full control of the employee for the time being, it not being sufficient that the employee is partially under the control of a third person."

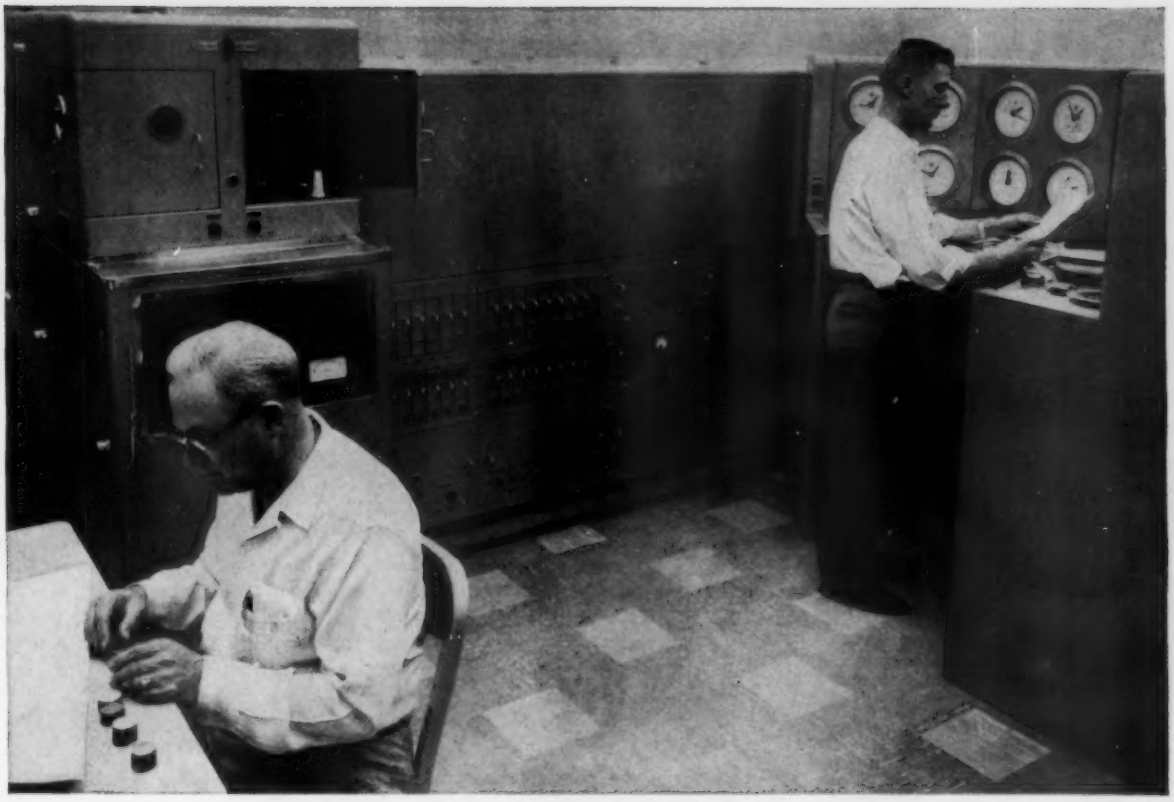
This higher court went on to explain that in order to transfer liability from the regular or general employer to another employer, there must be some consensual relationship between the loaned employee and the new employer whose service he enters, sufficient to create a new employer-employee relationship. In other words, where an employee enters the service of another at the command of and pursuant to the direction of the regular employer, no new relationship is created. While the employee may be subject to the direction of the temporary employer, he is there in obedience to the command of his employer, and in doing what the new employer directs him to do, he is performing his duty to his regular employer who gave the order.

Debtor and Creditor

A reader wrote an interesting letter, in part, as follows: "Please list for my scrapbook, in which I classify your legal writings, reasons why a purchaser of materials can without liability rescind a purchase contract and refuse to take delivery or pay for the shipped materials."

There are numerous reasons why a purchaser is able to refuse to pay the agreed purchase price or accept delivery. Also, after delivery is accepted the purchaser may, for nu-

(*Continued on page* 142.)



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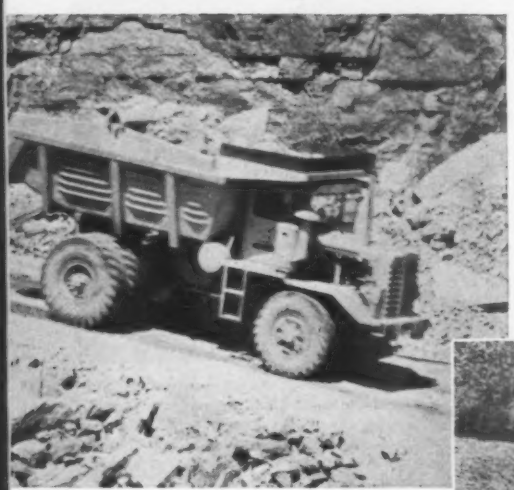

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Positive Torqmatic braking gives the operator complete control of this fully-loaded "95"—builds confidence to use the highest practical haul speeds, even when hauling down the steepest grades. "One-hand" power-steering teams with finger-tip brake lever control to give course-holding, grade-matching downgrade hauling stability. Torqmatic braking, standard equipment on the power-shift "95," is a Payhauler *plus*—furnished in addition to the standard, internal-expanding wheel brakes—to help give you "*extra*" loads on tough hauls!

Grade charts prove: only the 95 Payhauler delivers

Total grade and rolling resistance, 10%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	10.2	
Competitor X	8.0	27.5%
Competitor Y	8.0	27.5%

Total grade and rolling resistance, 11%

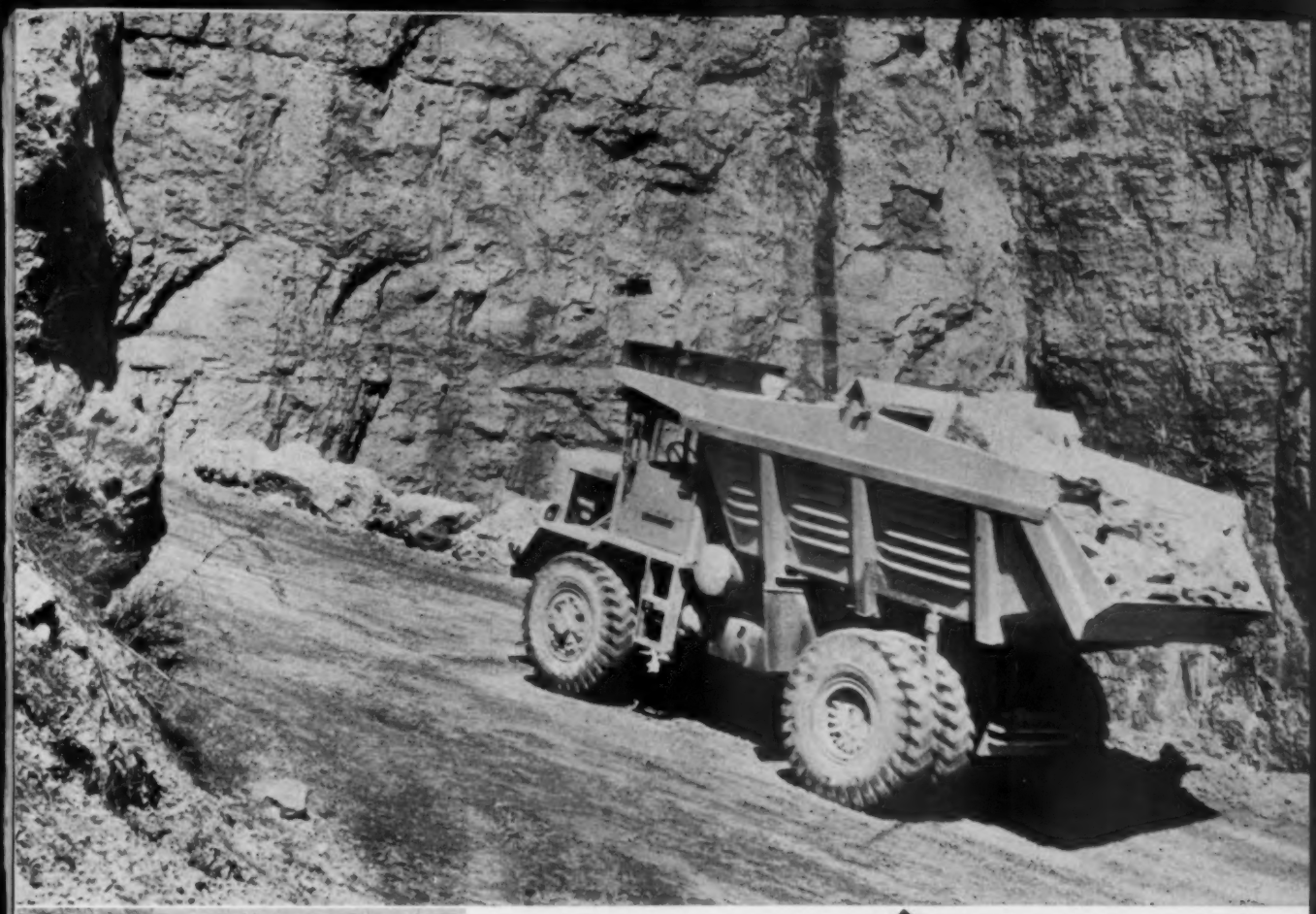
Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	10.1	
Competitor X	7.0	44.3%
Competitor Y	7.5	34.7%

Total grade and rolling resistance, 12%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	9.0	
Competitor X	6.3	42.9%
Competitor Y	7.0	28.6%

Total grade and rolling resistance, 13%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	7.9	
Competitor X	5.5	43.6%
Competitor Y	6.0	31.7%



Two 65 Payhauler rigs speed full 19-ton loads of dolomite from quarry to crusher—up a maximum climb-out grade of 16%. Powered by the 250-hp naturally aspirated "817" Diesel—equipped with weight-shedding corrugated steel body—the "65" consistently hauls 30% faster than competitive rigs! Price the "65"—you pay less per hp, less per struck yard and per ton of capacity than for competitive rigs!

Three 95 Payhauler trucks replace five competitive haulers in a large Chicago-area quarry. Reasons: fully-loaded "95's" haul upgrade as much as 44% faster than the competitive make—give fast, "big-target" loading—dump in only 11 seconds with exclusive power-up and power-down hoist action. And the cycle-gaining "95's" with Torqmatic power-braking, power-steering and power-shifting deliver "extra" loads on steep hauls!

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A COMPLETE POWER PACKAGE

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"extra" loads . . . over any 27-ton competitor

Total grade and rolling resistance, 14%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	7.2	
Competitor X	5.0	44. %
Competitor Y	5.5	30.9%

Total grade and rolling resistance, 15%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	6.4	
Competitor X	4.8	33.3%
Competitor Y	5.3	20.8%

Total grade and rolling resistance, 16%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	5.8	
Competitor X	4.6	26.1%
Competitor Y	5.0	16. %

Total grade and rolling resistance, 17%

Hauler	Hauling Speed (mph)	Payhauler Advantage
95 Payhauler	5.4	
Competitor X	4.5	20. %
Competitor Y	4.9	10.2%

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"Buy Through Your Local Welding Supply Distributor"

Other plants in: Denver • Los Angeles • New Castle, Delaware • Oakland, California • St. Louis

Welding products distributed in Canada by Canadian Liquid Air Co., Ltd.

Enter 142 on card, page 169

Legal Decisions

(*Continued from page* 138)

merous well defined reasons, rescind the contract, demand the seller to take back the materials, and refund the purchase price.

For illustration, either a valid rejection of delivery of merchandise, or rescission of the purchase contract may be based upon fraud on the part of the seller, or his agent. Contrary to the opinion of the majority of readers, the legal meaning of "fraud" is widely different from its ordinary dictionary definition. Legally, a seller is not guilty of fraud unless the purchaser proves all of these facts, as follows:

(1) There must be either conduct, acts, language, or silence on the part of the seller which is actually a misrepresentation; (2) these facts must be known to the seller at the time and before the sale contract is completed; (3) these facts of fraud must be unknown to the purchaser at the time he signed or made the contract; (4) the defrauding acts of the seller must be done with the intention, or at least with the expectation, that the purchaser will be influenced, (5) and the fraudulent conduct or promise, or guarantee, or statement of the seller must be relied upon by the purchaser.

Therefore, although a seller practices fraud upon the purchaser the latter has no legal recourse if the testimony shows that before the sale was completed the purchaser did not believe the fraudulent statements were true.

In a recent case, for example, the testimony showed that a seller guaranteed to a prospective purchaser of concrete blocks that the blocks contained concealed materials that considerably increased the strength and life of the blocks. Without knowledge of the seller a distant relative of the purchaser worked in the concrete block plant and he told the prospective purchaser that there were no concealed materials in the mixture from which the blocks were made.

In subsequent litigation, the higher court refused to hold the seller liable on his guarantee to the purchaser. This court explained that since the purchaser knew that the seller's guarantee was false, the pur-

Enter 143 on card, page 169 →

How many "machines" is a MODERN LOADER?

JOB-PROVE the 4-in-1 and see . . .

Here's what the 5 Four-in-One's, shown, are doing: (1) (Left foreground) The 3-cu. yd. TD-20 rig is 'dozing; (2) (Right foreground) The ¾-cu. yd. T-340 outfit as "carry-type scraper;" (3) (Right center) The 1⅛-yd. TD-6 4-in-1 "semi-skids" load on its skid shoes; (4) (Center): This 2¼-cu. yd. TD-15 "biting bucket" clam-handles a stump; (5) (Rear) TD-9 rig is back-dragging gravel!

It's a whole equipment spread of job-getting actions, if it's "the bucket with the bite"—an exclusive clam-action International Drott 4-in-1.

"Dragonized" to dramatize "the bucket with the bite," the five 4-in-1 sizes above demonstrate *plus* actions you get with the exclusive clamshell.

Full-capacity, full-range, depth-controlled bull-dozer performance. "Carry-type scraper" action to grade, strip, or spread with inch-close accuracy. Skid-Shovel action to "semi-skid" full buckets of material. Controlled back-dragging clam-action, to grade, pick up, or pull down materials. "Clamming-on" action to grab and load heavy unwieldy "impossibles."

Note also the 4-in-1 gives you the top excavator-loader performance on the market! That includes certified break-out forces ranging from 11,200 lbs. with the T-340, to 43,150 lbs. with the TD-20. And only the 4-in-1 gives you clam-type bottom dumping—that ends sticky materials loading problems, for good!

See for yourself how many "machines" the only *modern* loader is! Move the 4-in-1 machine-action selector lever. Prove you get a whole spread of money-making actions, that obsolete "single-action" loaders, and double for a yard-full of limited-duty rigs! See your International Drott Distributor for a 4-in-1 demonstration.

International Harvester Company, Chicago 1, Illinois
Drott Manufacturing Corp., Milwaukee 15, Wisconsin

INTERNATIONAL® DROTT®

BY CHOICE
...not by chance!

More operators specify Hendrix Dragline Buckets

"A Type for Every Digging Purpose"...
¼ to 40 Cubic Yards-Perforated or Solid

Hendrix Lightweight DRAGLINE BUCKETS

HENDRIX MANUFACTURING CO., Inc.
MANSFIELD, LOUISIANA

chaser was neither deceived nor defrauded.

Here are several reasons why a purchaser may without any liability refuse to accept delivery of the purchased merchandise, or refuse to pay for merchandise already delivered:

The quality of the merchandise does not comply with the terms of the seller's guarantee, or other clauses in the purchase contract; or (2) the seller has failed to ship the merchandise by the carrier specified in the contract; or (3) the seller ships merchandise C. O. D. instead of on open account, as stipulated in the contract; or (4) the object of the contract is illegal; or (5) the seller rescinds, varies, or changes the contract; or (6) the seller performs any other breach of the contract; or (7) the seller fails to make delivery at the promised time.

Also, the law is well established that a seller who otherwise breaches a contract of sale is liable in damages to the purchaser. The higher courts have consistently held that if a seller breaches a sale contract the purchaser (1) may upon discovery of the breach at once rescind the contract, sue and recover from the seller the money paid, in which case he must restore the materials he has received by virtue of the contract; or, (2) he may sue to cancel the contract, and in such case it is sufficient for him to offer to restore the merchandise which he has received under the contract; or (3) he may affirm the contract, retain the materials and sue to recover the damages he sustained by reason of the seller's breach.

Errors Not Valid

Another reader asked: "If through an error an employee or other person receives unjustifiable payments, or credits, what is the proper legal procedure?"

Recently a leading higher court held that if by mistake an employer, or other, credits or pays more than the contract price this fact does not entitle the employee or other person to collect in the future more than the contract price.

For example, in *Creek Gravel & Sand Company* v. *Play Construction Company,* 81 S. W. (2d) 416, it was disclosed that a highway contractor purchased sand and gravel for highway construction, An agreement was made between the gravel company and the contractor whereby the contractor unloaded the sand and gravel for the company.

Later the contractor sued the gravel company for payment of twenty cents per ton for unloading sand and gravel at the shipping destination. The only evidence which tended to support the contractor's suit was that he held a credit memorandum issued by the gravel company's bookkeeper showing a credit on his account for unloading sand and gravel at twenty cents per ton. The company's bookkeeper, who made up and issued this credit memorandum, testified that his allowance of twenty cents per ton for unloading sand and gravel was not authorized by his superiors. The higher court, therefore, refused to hold that the company must pay the contractor the amount he claimed to be due.

Scientific Proof Not Necessary

Last month a higher court rendered an unusually interesting decision to the effect that where testimony proves that an employee has been subjected to breathing dust for several months, he is entitled to compensation under the State Workmen's Compensation Act for the disease silicosis, although no scientific test was made to disclose the relative quantity of dust in the air he breathed during the last employment.

For instance, in *Childers* v. *Hackney's Company,* 337 S.W. (2d) 680, the testimony proved that an employee had had silicosis to some degree when he began work for his last employer, but such condition had not advanced to a disabling stage. He worked for the last employer for 23 months, where he was exposed several hours a day to dust from the sand, and at the end of the 23 months the silicosis had progressed to a disabling stage. The Workmen's Compensation Board awarded the employee compensation without requiring scientific proof that the presence of silica dust in the air was in sufficient quantity to be capable of causing silicosis. The higher court approved

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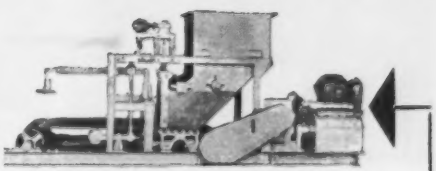

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this decision and award, saying:

"In the instant case Childers (employee) admittedly had silicosis. According to the medical testimony he had it in some degree when he began work for his last employer. However, it had not advanced to a disabling stage. He worked for his last employer for 23 months. There was testimony that he was exposed several hours a day to dust from the sand. At the end of the 23 months the silicosis had progressed to a disabling stage. Under these circumstances we think the board would have been entitled to find that there was injurious exposure within the meaning of the statute, without requiring scientific proof of the presence of silica dust in sufficient quantity to be capable of causing silicosis."

This decision was rendered notwithstanding the argument that where an employee has contracted silicosis in its initial stages in working for one employer, and then takes employment with another, he cannot hold the latter employer liable for compensation without scientific proof that silica dust was present in the place of his latter employment in sufficient quantity to be capable of causing silicosis in a healthy man.

Law of Compensation

Recently, I received an interesting letter from a concrete block manufacturer in part, as follows; "If a truck driver gets drunk and injures a fellow employee can his employer be held responsible in damages? Can the injured person get compensation?"

Modern higher courts consistently hold that there should be accorded to the Workmen's Compensation Act a broad and liberal construction. Doubtful cases will be resolved in favor of compensation to the employee or his dependents.

For example, in *Elm Company et al.* v. *Sullins*, 180 S. W. (2d) 113, it was disclosed that an employee was killed when he fell out of a moving truck. A fellow employee testified that, "We were talking and I was trying to get him to let me drive. I knew he had been drinking. He drove across the line two or three times."

Dependents of the deceased sued the employer for compensation. In rendering its decision in favor of the dependents, the higher court said:

"The burden was clearly upon appellant (employer) to show, by the testimony, that Sullin's death resulted solely from his intoxicated condition."

Other higher courts have convicted intoxicated truck drivers of murder and sentenced to serve 45 years, 20 years and another driver 5 years in penitentiaries because when drunk they killed pedestrians.

Can Use Different Name

A manufacturer of concrete burial vaults asked: "Can a person use a name, not his own, in making contracts, signing notes, chattel mortgages, etc?"

According to a late higher court decision, the answer is in the affirmative.

For illustration, in *Fidelity and Deposit Company* v. *Herb's Company*, 104 N. W. (2d) 292, the testimony showed that a person who represented himself to be Fred Jarvis purchased certain merchandise.

In latter litigation the testimony showed that actually the merchandise was not purchased by the real Fred Jarvis, but that the purchase was made by Fred Clair Clay who had represented himself to be Fred Jarvis.

The higher court held the note and mortgage signed "Fred Jarvis" by Fred Clair Clay valid and enforceable. This court said:

"The signing of the note and mortgage was not a forgery. Generally defined, forgery is the false making or materially altering, with intent to defraud, of any writing which, if genuine, might apparently be of legal efficacy, or the foundation of a legal liability. In the record here there is an absence of anything indicating the existence of a fraudulent intent."

This higher court went on to explain that a person, without abandoning his real name, may, unless he does so in order to defraud others, adopt or assume any name, wholly or partly different from his name, by which he may transact business, execute contracts, and carry on his affairs.

TRIAL SAMPLES

Of World-Famous WHITMORE'S Lubricants NOW IN AEROSOL SPRAY-ON CANS!

HANDI-LUBE LIQUID GEAR COMPOSITION

For open gears, sliding surfaces—exclusive formulas eliminate metal to metal contact, keep wear on the lubricant not the metal —no breakdown even after prolonged use under water—available for every climatic condition—packaged in handy 16-oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

WIRE ROPE SPRAY LUBRICANT

Exclusive formulas for lubricating and protecting wire rope, chain, springs. Penetrates to the core of wire rope minimizing internal friction and increasing usable life up to 300% —special protective qualities absolutely eliminate corrosion—non-gumming qualities reduce "carry-back"—packaged in handy 16 oz. aerosol spray-on containers or in bulk containers—send for a free trial sample.

65 YEARS OF LEADERSHIP LUBRICATING THE FOLLOWING:

• Open Gears, Dipper Sticks, Cams • Enclosed Gear Cases • Wire Rope and Cable
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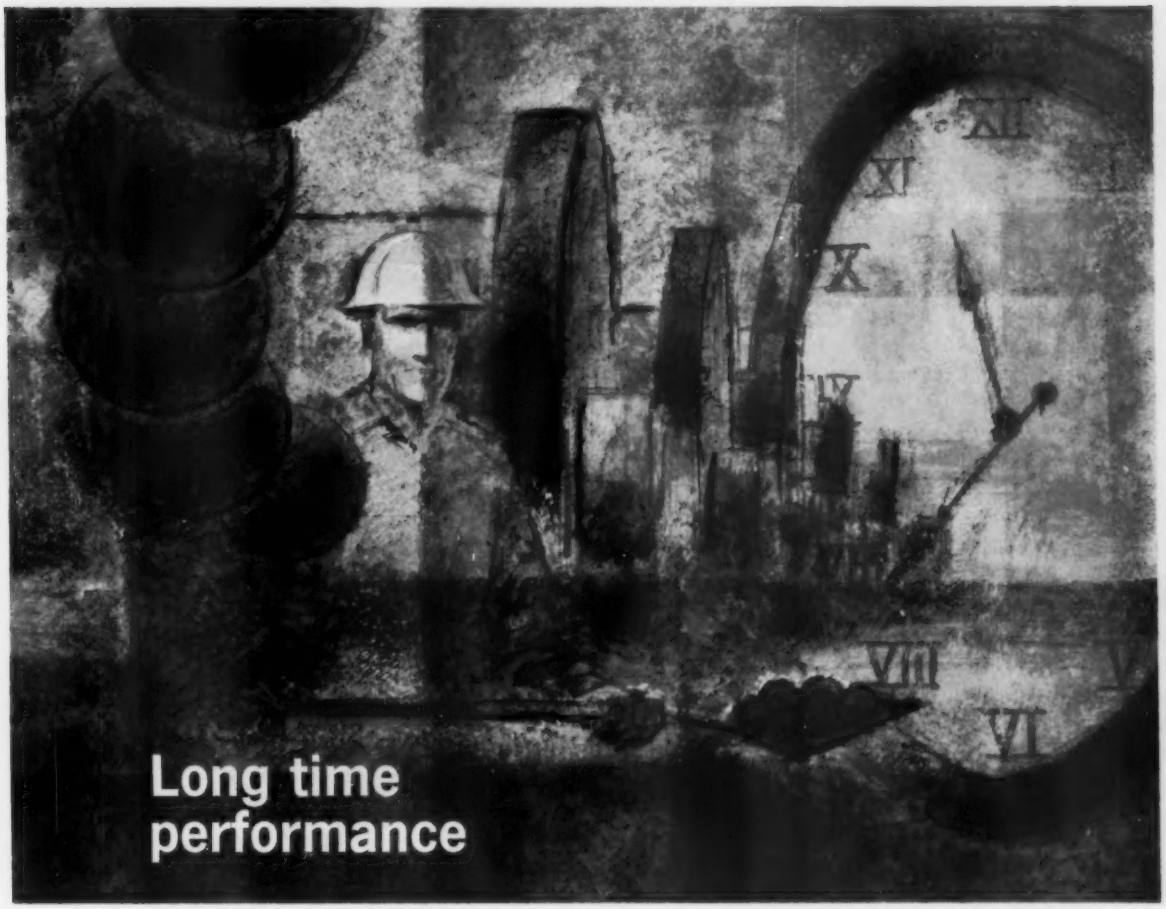
SHEFFIELD MOLY-COP Grinding Balls

COPPER-MOLYBDENUM-ALLOY



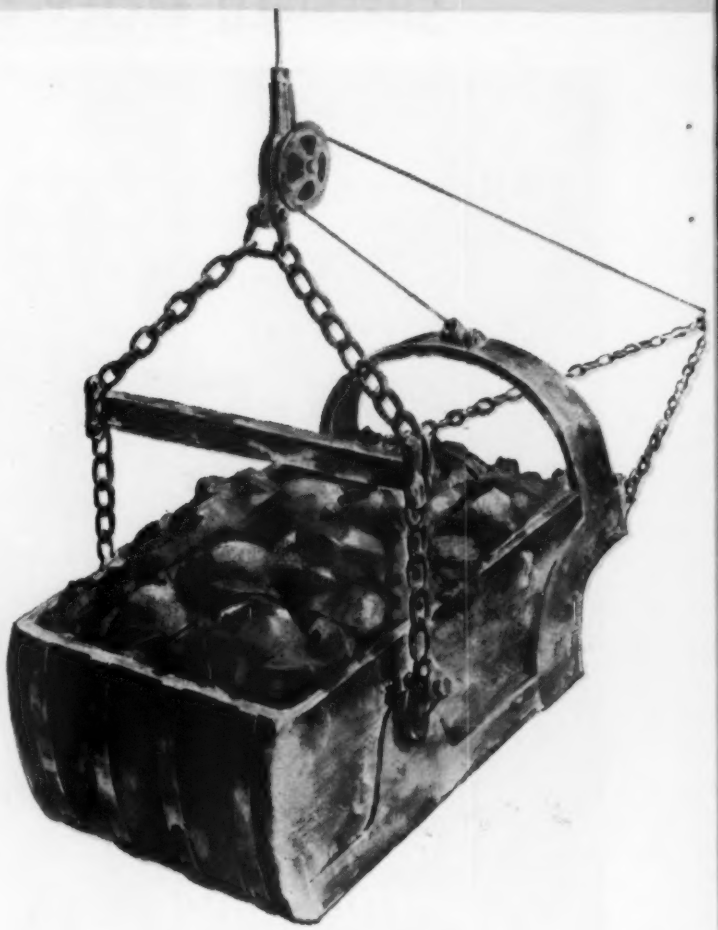
has earned customer acceptance

More than a million tons of Sheffield Grinding Balls, used in every kind of grinding job, have performed with dependability around the world. Top performance can be expected from Moly-Cop because Sheffield alloying, heat-treating and forging are kept consistently uniform by Sheffield constant quality control. Result: Moly-Cop Balls retain their sphericity longer, to give a better grind at lowest cost per ton. The Standard of Comparison Around the World. **Sheffield Plants: Houston, Kansas City, Tulsa**

ARMCO Sheffield Division

engine power
BY CATERPILLAR

How 33,000 psi cuts costs per ton



The heart of a dragline or excavator is its power source

Take the case of the Cat D397, used in the majority of large diesel powered machines. It has a horsepower rating of up to 730. Its 33,000 psi tensile strength block is precision built to provide a strong, rigid framework for all engine parts.

Here are just a few of the other features that make the D397 your best buy for excavator power. Turbocharging gives higher horsepower per pound of engine. Oil is 100% filtered to lengthen overhaul periods and engine life. Non-clogging, single-orifice injection valves let you use low-grade, low-cost fuels with cetane ratings as low as 35. These fuels have more BTU's per pound; they provide more energy per gallon.

Bearings are steel-backed aluminum alloy for high load-carrying capacity and resistance to corrosion and wear. Cat piston assemblies combine light weight in aluminum pistons, high wear resistance in chrome rings and the durability of cast iron in the top ring band. Heat treated, wet liners are full length to give rapid heat transfer, longer ring, liner and lube oil life.

If you could look inside the Cat D397 Engine you'd see additional evidence of quality in the high-strength crankshaft, in precision-ground camshaft, in the efficient cylinder heads and valve train.

Your Caterpillar Dealer is the man to see for complete facts. He'll tell you how you can save more money and make more money with Caterpillar powered excavators. Get in touch with him. It may be one of the most profitable talks you've ever had.

The D397's cylinder block is cast in Caterpillar's own foundry. Careful control, modern processing and rigid inspection all along the line insure a rugged foundation for all engine parts.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

Engine Division, Caterpillar Tractor Co., Peoria, Ill., U.S.A.

Manufacturers' News

R. A. Cumming

Cummings Engine Company, Inc., has announced the appointment of ROBERT A. CUMMING to the position of director — engine sales, construction and industrial equipment. Mr. Cumming has been associated with Cummins since early 1960 as manager, Los Angeles regional office. Prior to joining the Cummins organization, he was manager of manufacturer sales for the Caterpillar Tractor Company.

Also named to new positions are: H. J. GRANINGER, director—engine sales, highway equipment; J. P. MORGAN, director—field sales; L. M. GRIFFIN, director—government sales; J. L. KEYES, director—sales services; and W. D. BLIZZARD, general manager — Cummins Diesel Sales Corporation.

American Enka Corporation has announced plans for a major expansion of its nylon facilities at Enka, N.C., to produce heavy denier yarns for tires, industrial, and other uses. The expansion will increase present nylon production capacity by 70 percent and the project will be the largest single expansion undertaken by the firm at its Enka location since the original rayon plant was built there in 1928.

Enka, reported as the nation's second largest producer of rayon, entered the nylon field in 1954. The company reports its nylon operation has been in an almost continuous state of expansion since that time, having undergone 8 different equipment or building enlargements.

In addition to its rayon and nylon plants at Enka, N.C., American Enka has rayon plants at Lowland, Tenn., and tire and cable plants in Connecticut, Massachusetts, and California.

Appointment of WADE K. HALVORSON as vice-president in charge of the manufacturing division of Mine and Smelter Supply Company, Denver, Colo., has been announced. Mr. Halvorson has worked in the Denver office for 16 years. He has held positions as personnel and office manager, and assistant to the general manager. He was appointed director of the manufacturing division in 1960.

JOHN G. ROESCHLAUB has been appointed a sales engineer for the manufacturing division. His most recent position prior to joining Mine and Smelter was as metallurgist for Southern Peru Copper Corporation's new plant at Toquepala.

Baldwin-Lima-Hamilton Corporation, Construction Equipment Division, Lima, Ohio, announces the appointment of Reid-Holcomb Company, Inc., 1815 Kentucky Ave., Indianapolis, Ind., as distributor for LIMA Austin-Western crushing, screening, and washing equipment. Territory for crushing equipment covers the state of Indiana except Lake County.

The Reid-Holcomb Company, with branch office in Evansville, Ind., is also distributor for LIMA shovels, cranes, and draglines.

Hardinge Manufacturing Company, York, Pa., has announced that Tom McKeown and Associates are now their representatives in the greater Philadelphia area, offering "Meehanite" and "Ni-Hard" castings, machine shop work, plate steel work, pattern-making, and large custom machinery.

Since 1952, THOMAS F. MCKEOWN has been a manufacturer's agent in eastern Pennsylvania, southern New Jersey, Delaware, and Maryland. Tom Holt is sales associate. McKeown headquarters are at 47-2 Revere Road, Drexel Hill, Pa.

In Cement and Aggregates the Word for Air Separation is "Sturtevant"

in cement . . .

Sturtevant Air Separators make possible highly efficient closed-circuit systems. Large circulating loads increase output, eliminate overgrinding. Ball and lining life lengthens, power costs are lowered. Top quality cement results from precise control of finenesses. Standard 16 ft. Sturtevants deliver raw fines up to 70 tph, finished fines up to 260 bph.

in aggregates . . .

Sturtevant Air Separators classify sand without water, clean sand by de-dusting it. Pre-classification by air can also increase screening production by removing screen-blinding fines. In blending operations, Sturtevants select desired fines from grinder throughput. This graded product is then used to overcome fineness modulus deficiencies.

Send for Air Separator Bulletin No. 087.

STURTEVANT
MILL COMPANY
104 Clayton St., Boston, Mass.
Crushers • Grinders • Micron-Grinders • Separators
Blenders • Granulators • Conveyors • Elevators
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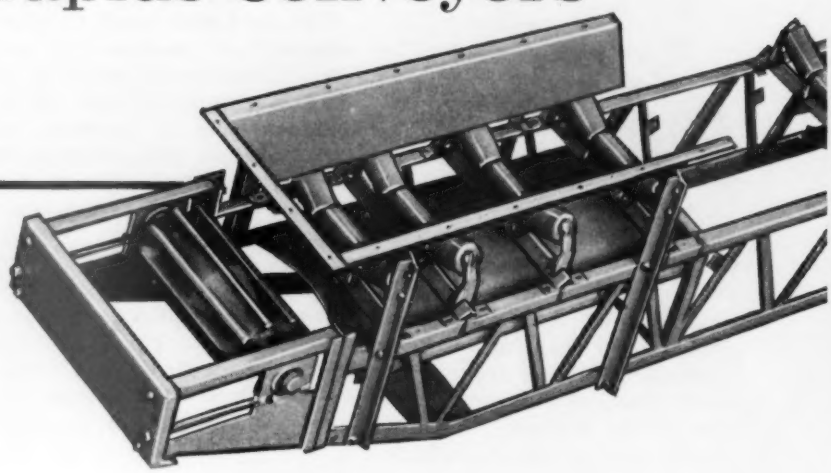
STRIGID*

is the word for new-design Cedarapids Conveyors



* Strong, Rigid construction is the prime requirement for a conveyor system that helps maintain a profitable operating pace and reduces your material handling costs. New-designed Cedarapids Lattice Frame Conveyors are engineered for strength and rigidity . . . they're "Strigid!"

What is the first thing to look for when you buy conveyors?

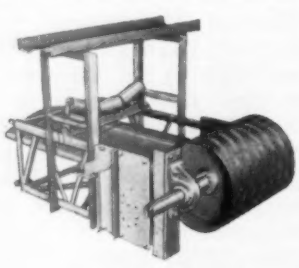
Design and construction features that insure moving more tons at lowest cost per ton.

And that's what you find when you look critically at the new "strigid" design of Cedarapids Conveyors!

Strong construction is a must for handling today's increasing hourly tonnages. Cedarapids' rugged truss design, with diagonal angle-steel side bracing the full depth of the truss, gives extra strength without extra weight; permits longer spans between supports with no sacrifice of stability. End frames are reinforced at each corner with gusset plates and securely fastened with 4-bolt connections to resist distortion from external stress. One of the many Cedarapids extra-strength design features is the wide use of clamp-on, hook-on mountings to eliminate bolt holes which tend to weaken the conveyor structure.

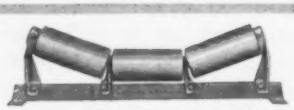
Rigid stability is another result of Cedarapids' "strigid" construction. Rectangular end frames between sections, reinforced with gusset plates, give added rigidity to joints. Frames are engineered for rigid, structural stability to support the load without weaving or buckling. Lateral cross bracing between side members assures extra resistance to wind sway.

True alignment is assured by pre-engineered "strigid" construction. Components are built on special fixtures and jigs, and jig-welded for the perfect alignment that comes with structural strength and rigidity. Truly accurate alignment simplifies training the belt and increases belt and roll life.



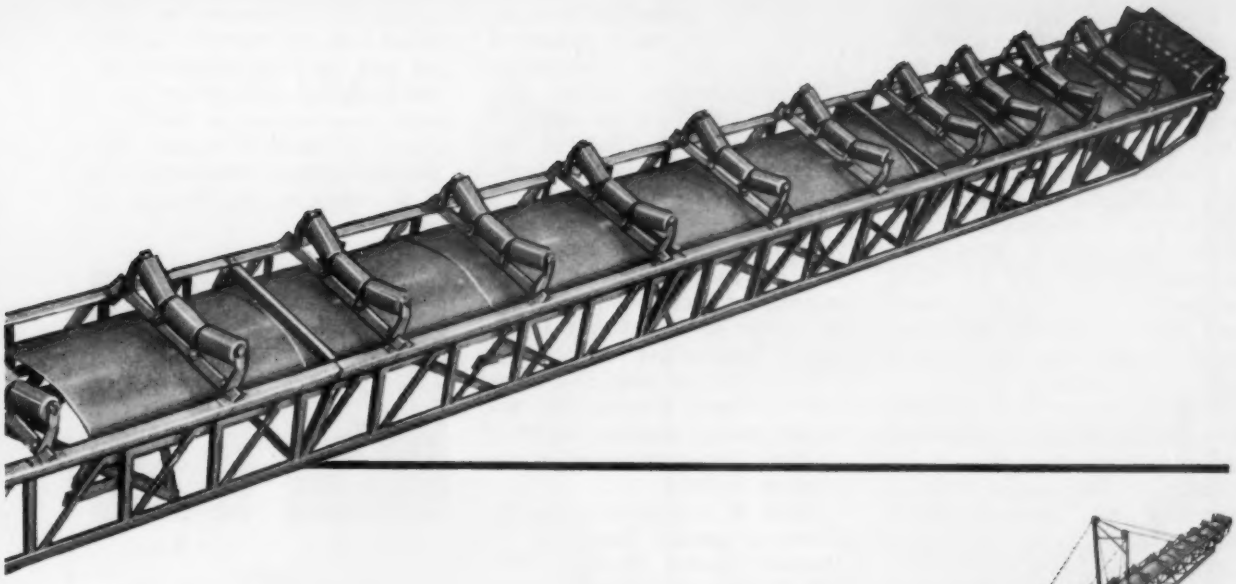
JIG-WELDED HEAD SECTIONS, box or taper styles, ruggedly designed for strength without increased weight. Wide-faced, crowned head pulleys are reinforced with extra discs for added strength. Carborundum-coated Safety-Grip Lagging reduces slippage and requires less belt tension.

Modular design means greater convenience, greater savings for you. Standardized, interchangeable conveyor components are pre-engineered at the factory for job-engineered erection that is fast, easy, and low cost. Order your modular components "off the shelf." They arrive on the job pre-fit for perfect alignment. There's no cost or delay for special engineering, special drawings or calculations. It is simple to order just what you need for your job, tailored to your requirements. And modular components cost less... our quantity production savings are passed on to you.



TROUGHING ROLLS and return idlers are made by Cedarapids for the absolute quality control that insures uniformity, perfect balance and maximum strength. Life-Seal ball bearings are permanently lubricated and sealed at the factory. Clamp-on mounting allows easy adjustment for belt training and for altering the standard 4' spacing to handle special applications.

Adaptability is another important savings benefit. Additional modular



INTERMEDIATE SECTIONS are jig-welded for true alignment. Rugged truss design permits longer spans between supports with no sacrifice of rigidity. 8', 10' and 12' sections available to adapt conveyors to any needed length in 2' increments.

conveyor components are always available from stock, ready for immediate delivery. You can extend or alter your conveyor system in the field with minimum time and cost. Add clamp-on troughing rolls to handle greater loads when necessary. Head and tail sections accommodate a useful range of shaft, bearing and pulley sizes without structural alteration.

Cedarapids "Strigid" Conveyors are pre-engineered to cover a wide range of applications, handling light or heavy materials horizontally or on an incline, with belt widths from 18" to 36", in any even foot length. Components are designed for fastest, easiest erection and quick field alterations to meet changing needs.

Start saving material handling money today. Your Cedarapids Dealer can give you a quick quotation for prompt delivery of your Cedarapids "Strigid" Conveyor.

CEDARAPIDS portable lattice frame conveyors are engineered with the same strong, rigid design as "strigid" stationary conveyors. Cable method of erection saves on maintenance. A self-locking independent hand or electric winch adjusts conveyor to any height up to 22°. Cedarapids Strigid portables are available in 18", 24", 30" and 36" widths, in lengths up to 70 ft.

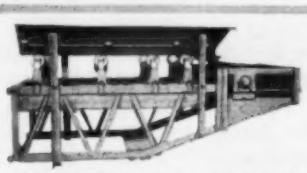
SEND FOR THESE NEW BULLETINS

Cedarapids "Strigid" Conveyors incorporate so many new design features it takes a 16 page bulletin to describe all their money-saving, profit-making details. When you send for your copy of Conveyor Bulletin CON-2, be sure to ask for the new Conveyor Selection Manual containing necessary tables and charts and listing lengths, widths, drives, horsepower and all other data you need to select your tailor-made conveyor components "off the shelf."

IOWA MANUFACTURING COMPANY

Cedar Rapids, Iowa

Cedarapids



JIG-WELDED TAIL SECTIONS, in both taper and box styles, are interchangeable. Clamp-on hopper framework eliminates bolt holes to maintain structural strength. Self-cleaning wing type tail pulleys feature the same quickly detachable hubs used in the head pulleys.

IOWA MANUFACTURING COMPANY
Cedar Rapids, Iowa

Gentlemen: Please send Bulletin CON-2 with details about Cedarapids new-design Strigid Conveyors. Also send the Conveyor Selection Manual.

Name_____

Company_____

Address_____

City_____ State_____

S860-N

Harnischfeger International Corporation, S.A., a wholly owned subsidiary of Harnischfeger Corporation, Milwaukee, Wis., is opening a new office at Hamburgo 108, Desp. 202A, Mexico City, Mexico.

The new operation, headed by C. P. COUSLAND, vice-president and director of Harnischfeger International, will provide sales-service technical assistance for the parent company's line of P&H power cranes and shovels, welding equipment, diesel engines, overhead traveling cranes, and electric hoists.

Through the new office in Mexico City, Mr. Cousland will administer the subsidiary's affairs through distributors in 13 Mexican and Central American cities. These distributors have main offices in the Mexican cities of Guadalajara, Mexico City, Monterrey, Chihuahua, Ciudad Obregon, Tampico, and Torreon.

Other Central American distributorships in his territory are in San Jose, Costa Rica; San Salvador, El Salvador; Guatemala City, Guatemala; Tegucigalpa, Honduras; Managua, Nicaragua; and Panama City.

JOHN W. CARLSON has been appointed assistant general manager of the Allis-Chalmers Construction Machinery Division. He had been general manager of the Deerfield Works since Allis-Chalmers acquired the Illinois firm (formerly the Tractomotive Corporation) about a year ago.

Mr. Carlson joined Allis-Chalmers in 1938 becoming a sales engineer for tractor equipment. After service in World War II, he joined Tractomotive as a design engineer. A year later he became assistant general manager, and was named general manager in 1952. He was elected president of the company in 1954.

JAMES B. CODLIN succeeds Mr. Carlson as general manager of the Deerfield Works. He also joined Allis-Chalmers in 1938 serving from 1939-45 at the Springfield, Ill. Works.

He joined Tractomotive in 1945 as chief engineer, a position he held to the present. Mr. Codlin was elected a vice-president of Tractomotive in 1955.

VERNON L. PERKINS has been named sales representative in Oregon and northern California for P&H construction and mining equipment manufactured by Harnischfeger Corporation, Milwaukee, Wis. The firm's district office is at 1224 S. W. Morrison St., Portland 5, Ore.

V. L. Perkins

A. E. Lee

Appointment of A. EARL LEE as marketing co-ordinator of J. I. Case Company has been announced. Mr. Lee will co-ordinate all phases of the Case marketing operation including product development and market research.

For the past three years he has been with Massey-Ferguson, Toronto, where he served as a member of the corporate (International) marketing staff and as general manager, marketing and economic research, North American Operations. He was also with Doane Agricultural Service, St. Louis, and was an instructor of agriculture.

Appointment of three dealers for the Gradall and Hopto lines has been announced by I. T. WHITE, manager of construction equipment sales for The Warner & Swasey Company, Cleveland, Ohio. The Highway Equipment & Supply Company, Harrisburg, Pa., is the new Gradall-Hopto dealer in 32 counties in Pennsylvania.

The M-W Equipment Company, Division of Metalweld, Inc., in Philadelphia, has been assigned a territory consisting of eight counties in Pennsylvania, nine counties in New Jersey, and Newcastle County in Delaware.

The Bark River Culvert & Equipment Company, Eau Claire, Wis., has been assigned the territory of the upper peninsula of Michigan and all of Wisconsin except the counties of Ashland, Bayfield, and Douglas.

GRIPPER EDGES ON VIBRATING SCREEN SECTIONS

Is the gripper or flange design right for your vibrating equipment? Are the flanges held parallel? Is the radius of the flange hook correct? Does the cloth lie flat? Are the ledges clean? Is the tension drawn on the screen section squarely? Check these points carefully to correct gripper edge problems. Call Cleveland Wire Cloth for valuable assistance and top quality vibrating screen section cloth.

Write for *FREE* maintenance-reducing check sheet today.

THE CLEVELAND WIRE CLOTH & MFG. CO.

3574 EAST 78th STREET CLEVELAND 5, OHIO

Enter 152 on card, page 169

NEW!

Combination
ROTARY-PERCUSSION AIR DRILL

Features:

1. Operates as conventional rotary air drill or as down-the-hole air hammer that can run drag bit or percussion bit.
2. All-hydraulic drive.
3. Completely self-contained . . . tractor engine, all components.
4. Variable speed controls on pull-down and hoist.
5. Hole size 2½" to 4½".

DEALER
INQUIRIES INVITED

1103 N. Rice Ave. MOhawk 7-5895

Carey MACHINE & SUPPLY INC.

P. O. Box 63 Houston 1, Texas

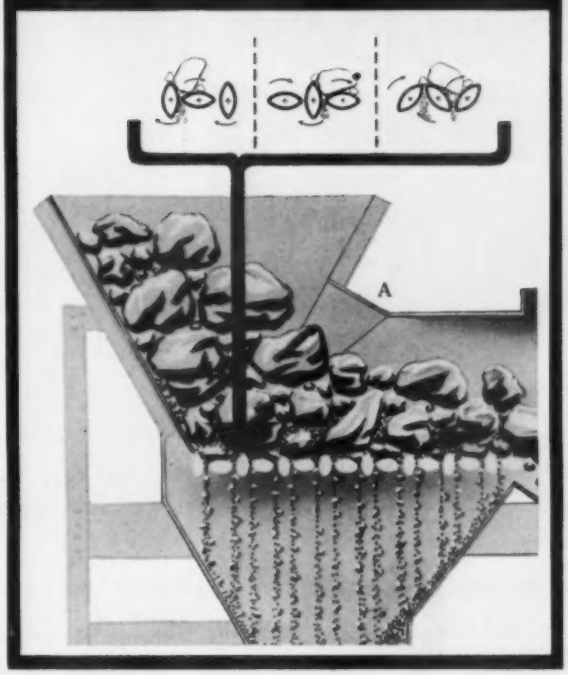
Enter 153-A on card, page 169

Furnishes a positive seal for round flexible joints. Used by leading dredging and hydraulic sand-and-gravel operators, and the U. S. Engineering Corps. This Multi-use chain sleeve clamp is easy to apply . . . positive in action. Write for illustrated folder, today.

The Black Brothers Co., Inc., 501 9th Ave., Mendota, Ill.

Enter 153-B on card, page 169

Wobbler Feeder



Doubles primary capacity of limestone operation

A prominent Arkansas white lime company installed a Wobbler Feeder to satisfy their need for a uniform size material with minimum fines for calcination. They also wanted increased output.

They doubled the primary capacity of their limestone operation. And they got a high quality finished product.

Here's how: the Wobbler Feeder (A) takes material directly from the quarry. The tumbling, rocking, forward motion of the load on the Wobbler, quickly and efficiently sifts fine clay and material under 4½" to bottom conveyor, by-passing the jaw crusher completely. Because the Wobbler scalps as it feeds without binding or plugging, it is particularly valuable in wet, sticky material.

The Lime Company's Wobbler Feeder handles from 1200 to 1500 tons per day. Since the Wobbler sends only oversize to the primary crusher, the crusher can handle more material per day, and the Wobbler requires less power than any previous feeding equipment. It is not surprizing that this Arkansas producer is pleased with his purchase.

Learn more about the profitable advantages of the Wobbler Feeder.

FOR THE NAME OF THE HAMMERMILL REPRESENTATIVE NEAREST YOU, WRITE:

HAMMERMILLS, INC.

Subsidiary of PETTIBONE Mulliken Corp

625 "C" Avenue N.W., Cedar Rapids, Iowa

Enter 153-C on card, page 169

C&ECo
Continental
CONVEYOR
IDLERS

STANDARD ITEMS FROM STOCK!

Whatever your needs in bulk materials handling equipment, you'll find it in the Continental Conveyor line. Pulleys, Bearings, Take-Ups, Drives, Trippers, Feeders, Hold-Backs.

Call on your
CONTINENTAL CONVEYOR MAN

Continental
CONVEYOR & EQUIPMENT CO.
Winfield Alabama

Sales Offices in: ATLANTA BIRMINGHAM DALLAS HUNTINGTON MEMPHIS NEW YORK

Formerly Industrial Division, Continental Gin Co.

Enter 154 on card, page 169

Program participants, CIMA Parts Council Meeting. (From left, seated) T. L. Mellish, Allis-Chalmers Mfg. Co.; Council chairman, D. H. Dolman, Diamond Iron Works; Program chairman, R. H. Haltenhoff, International Harvester Co.; R. B. MacArthur, Detroit Diesel Engine Div., G.M.C. (From left, standing) R. F. Kehrer, J. I. Case Co.; W. E. Putz, Barber-Greene Co.; V. Emery, Aeroquip Corp.; F. A. Rager, LeTourneau-Westinghouse Co.; The Frank G. Hough Co.

116 parts department managers of construction equipment manufacturers attended a recent meeting of the Construction Industry Manufacturers Association (CIMA) Parts Council in Chicago. The program theme was "Sales Promotion and Merchandising of Parts".

Slide and movie presentations of methods now being effectively used to increase their company parts sales were shown by the member representatives pictured above. A special feature of the meeting was an exhibit by 25 member companies of their parts sales promotional material.

This was the 8th all day meeting of the Parts Council which is sponsored by the CIMA. This group, within the framework of CIMA, is comprised of parts managers from 150 manufacturing companies. Two general meetings are held each year. The programs are conceived by the members and designed to present new ideas that will be helpful in the conduct of their business and to promote discussions of mutual industry problems.

Star Wire Screen & Iron Works, Inc., formerly located in Los Angeles, has recently moved into its new single-floor plant and warehouse in the City of Industry, Calif. The firm is a subsidiary of Ludlow-Saylor Wire Cloth Company.

Star reports the new plant greatly increases its capacity for both production and warehousing of a complete range of industrial wire cloth and screen from the finest to coarsest mesh in all normally required weaves, metals, and wire sizes.

E. J. Goes

E. J. GOES, a veteran of 47 years with Koehring Company, retired from the Company in December. Mr. Goes was advertising and publicity manager from 1932 until 1959, directing the advertising and sales promotion activities of all Koehring divisions and subsidiaries. Since 1959 he has been publicity manager, in charge of shows, conventions, exhibits, and trade association work.

Mr. Goes plans to continue in some phase of advertising, making his long experience available to industry on a consulting basis. He has served in key capacities in trade association groups, serving as chairman of the Manufacturer's Division of the National Sand and Gravel Assn. and as a Director of the Manufacturer's Division of the Nationai Crushed Stone Assn.

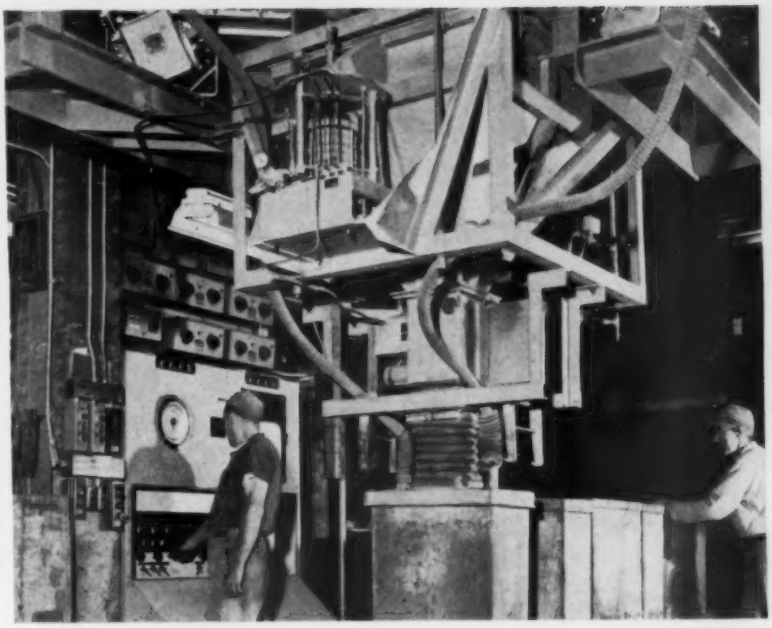
A past president of the Milwaukee Chapter of the Association of Industrial Advertisers, Mr. Goes also served as vice-president of the national AIA group. He has been active in promoting better understanding among advertisers in the construction equipment field, helping to found the Construction Equipment Advertisers and the Wisconsin Industrial Editors Assn.

Mr. Goes' duties with Koehring will be taken over by the company's advertising manager, MARTIN B. JAEGER.

GEORGE R. FOX, works manager of Joy Manufacturing Company plants in Franklin, Pa., since 1953, has been elected vice-president of manufacturing, Joy International, S.A., a wholly owned subsidiary which guides the company's overseas operations from headquarters in Monaco.

In his new position Mr. Fox will work on manufacturing matters with Joy's wholly owned manufacturing subsidiaries in Australia, France, Great Britain, and South Africa. He will also act in liaison between these operations and Joy's eight manufacturing plants in the U. S.

AT CARBORUNDUM...



Accuracy and Instantaneous Control Response with W & C BATCH-WEIGHING SYSTEMS

Critical formulation standards are maintained at lower cost since Carborundum Company has introduced automatic batching of ingredients at their Perth Amboy, N. J. refractories manufacturing plant. The new automatic system—designed with W & C pre-engineered and laboratory-tested "building block" components—has greatly increased production, reduced labor costs, and decidedly improved the accuracy of batch weight control.

Chief reason for the accuracy of W & C Batch-Weighing Systems is the patented Uniforce flexural frame used in supporting both weigh-hoppers and weight transmitters. These unique flexural frames ensure accurate weighing under *all* load conditions, resolve *every* force and moment into a single vertical component applied to the load transducer.

Immediate response to control material flow in *any* batching operation is provided by the W & C Pneumatic Weight Transmitter, a force-balance instrument delivering a highly reproducible, (1 part in 2000) almost *instantaneous* signal directly proportional to net weight. No possibility of overshooting specified ingredient quantities. Practically no maintenance, compared with mechanical systems. The W & C scale is dynamically faster than a beam-and-balance or flexural beam system . . . W & C uses air, has no inertial mass to overcome . . . comes into balance sooner than a mechanical system.

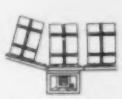
For *consistently* accurate reproduction of bulk material formulations in any batching operation—single ingredient weighing to sequential multi-ingredient proportioning—you can depend on W & C.

WRITE FOR BULLETINS / Bulletin 30 fully describes W & C Batch-Weighing Systems
Bulletin 14 describes other W & C Automatic Weighing Systems

WC 100

CONVEYOR SCALE SYSTEM

CONSTANT-FEED WEIGH-HOPPER SYSTEMS



CHECK-WEIGHING SYSTEMS

CONTROL PANELS

Weighing & Controls, Inc.
Subsidiary of **CompuDyne Corporation**
Industrial Park, E. County Line Road, Hatboro 10, Pa.

Enter 155 on card, page 169

BEST STABILITY IN THE BUSINESS

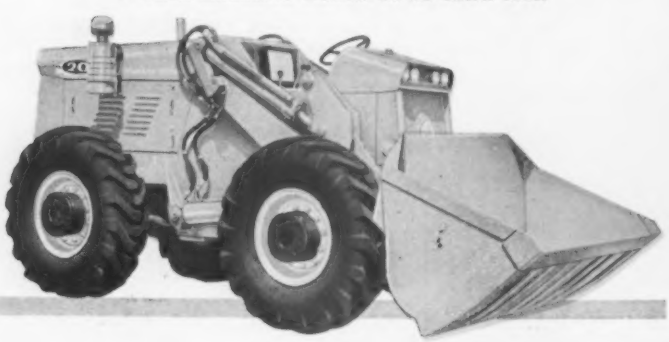
The Allis-Chalmers TL-20 gives you a higher wheelbase to length ratio for added fore and aft stability. You carry big loads at high speeds with minimum spillage.

The 130-hp Allis-Chalmers TL-20 tractor loader gives you the kind of stability you need to move big loads fast over the roughest terrain . . . without tipping or spilling the load. Long 7-ft, 9-in. wheelbase is 43 percent of over-all length with bucket at carry. This gives the TL-20 a higher wheelbase to length ratio than other loaders of this size.

Extra stability is just one reason why you get extra production with the 11½-ton TL-20. Other profit-producing advantages are: *Single-lever speed and direction control; pin-connected axles* that eliminate shifting and rolling under load; *5-way hydraulic filtering* that provides maximum protection; *extra-long reach* for faster and easier dumping; and *well-located dump cylinders* that are up and out of dirt for better performance . . . longer life.

Ask your Allis-Chalmers dealer about the complete line of tractor loaders—5 models—with buckets from 1 to 5 cu yd, 76.5 to 130 horsepower. Allis-Chalmers, Construction Machinery Division, Milwaukee 1, Wisconsin.

Now available in Persian Orange or Allis-Chalmers Yellow at no extra cost.



move ahead with

ALLIS-CHALMERS

power for a growing world

Enter 156 on card, page 169

ALLIS-CHALMERS
20

MARION . . . a dependable and profitable partner FOR HEAVY-DUTY HAULING

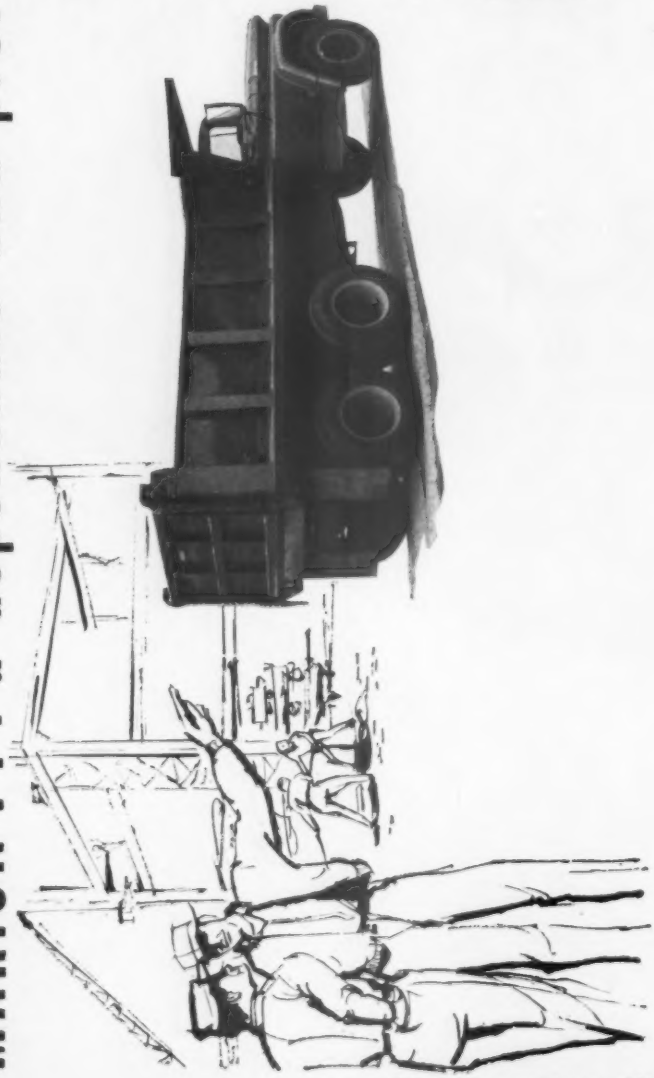
This heavy-duty, 10-yard Marion dump body is especially adaptable for use — in quarries . . . on construction sites . . . in and around gravel pits — wherever conditions are unusually severe and extra ruggedness is required for better off-the-road operations.

With this MD style body, contractors can take their choice of two types of extra strong, fast acting Marion hoists used for the dumping operation — a front mount telescopic hoist or an underbody, double arm hoist.

This combination of a heavy-duty Marion body and hoist has provided many owners throughout the country a dependable and profitable partner for their operations. It can do the same for you. We'd welcome the chance to give you all the facts.

MARION SHOVELS AND HOISTS

MARION METAL PRODUCTS CO.
Marion, Ohio, U.S.A.



Enter 158 on card, page 169

VICTOR S. LUKE, division manager, has announced that West Virginia Pulp and Paper Company is strengthening its Multiwall Bag Division by consolidating the sales organization on a divisional basis and launching an intensive market development program.

J. M. Elsas

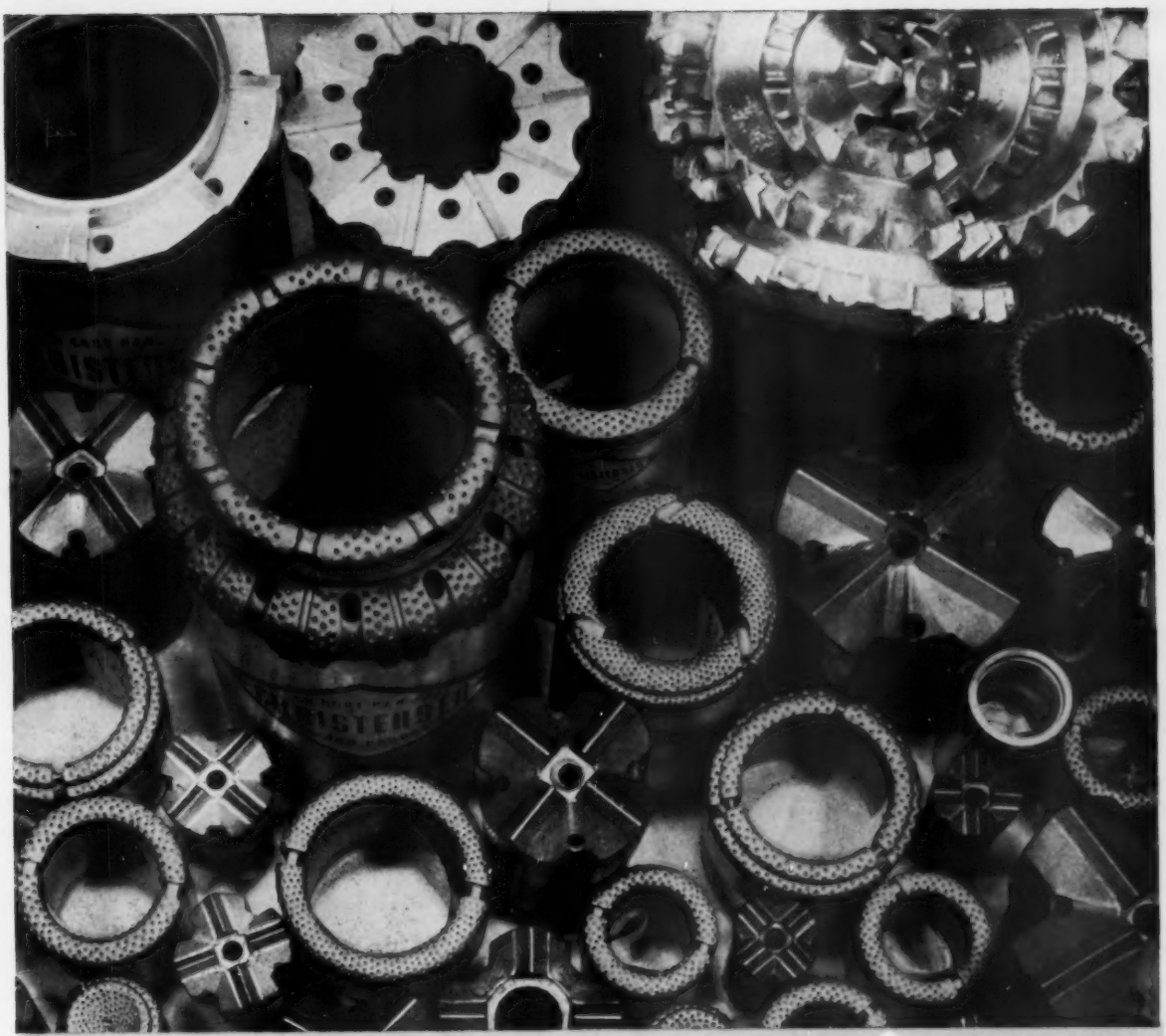
S. Y. Carnes

JASON M. ELSAS and SHELDON Y. CARNES, managers of the division's Southern and Northern regions respectively, have been given new responsibilities. Mr. Elsas has been appointed to the new position of sales manager for the entire division. His new headquarters is in New York.

Mr. Carnes has been named market development manager for the division. In his new assignment, he will develop new markets for multiwall products and explore the market potential of new products in this field.

Two shifts in district sales territories were also announced. The sales office headquartered at Charlottesville, Va., has been made part of the sales district centered in Atlanta, Ga.; and the Kansas City district has been combined with the Chicago district. HENRY M. HOWE will direct sales for the consolidated district at Atlanta, and H. LOCKWOOD DRIZZELL, formerly district manager in Charlottesville, will manage the expanded Chicago district.

Happel & Sons, Incorporated, 309 Third Ave., S.W., Cedar Rapids, Iowa, is a new distributor for the New Leader products of Highway Equipment Company, Cedar Rapids, Iowa. Happel & Sons serves the Iowa counties of Grundy, Black Hawk, Buchanan, Delaware, Jones, Linn, Benton, Tama, Poweshiek, Iowa, Johnson, Cedar, Washington, Keokuk, and Mahaska.



If your problem is making hole . . .

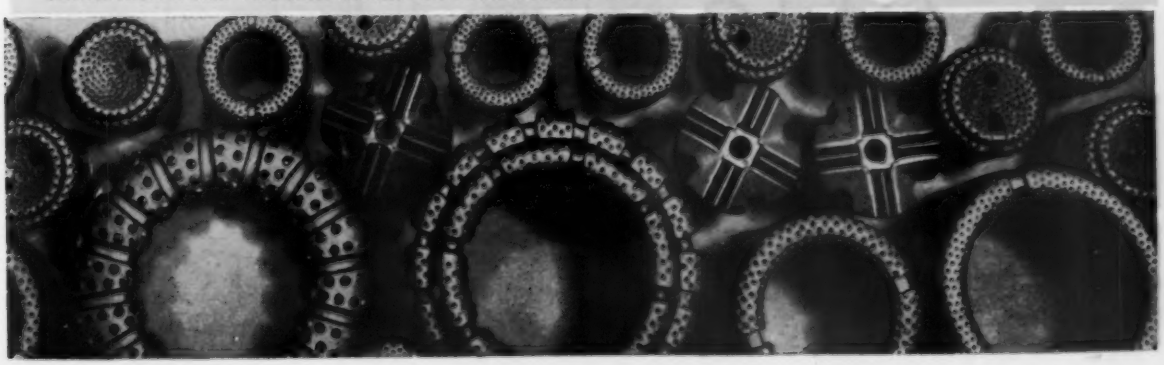
. . . Christensen offers a complete line of diamond bits, reaming shells, and core barrels. Also available are tungsten carbide and roller cone bits. When you need "complete" custom bit service, contact Christensen.

"Less cost per foot"

CHRISTENSEN DIAMOND PRODUCTS

MAIN OFFICE AND PLANT 1937 SOUTH 2nd WEST
SALT LAKE CITY, UTAH

SERVICE FROM WORLD-WIDE SALES OFFICES AND MANUFACTURING PLANTS

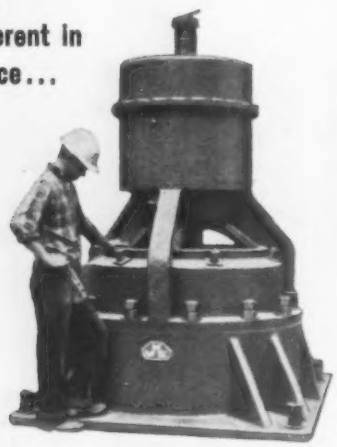


An announcement of

A new advanced design crusher for secondary and tertiary reduction is now available. It is the *KONE-O-MATIC*® and it is made by KENNEDY VAN SAUN, pioneer in the field of reduction crushing.

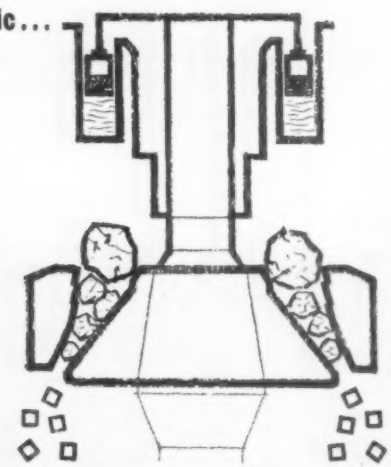
How is this new machine different from other crushers?

It is different in appearance...



It is low—lowest receiving opening—and, consequently, the purchaser of a *KONE-O-MATIC* obtains the maximum benefit from low design; buildings and conveying equipment are less costly; valuable space is conserved.

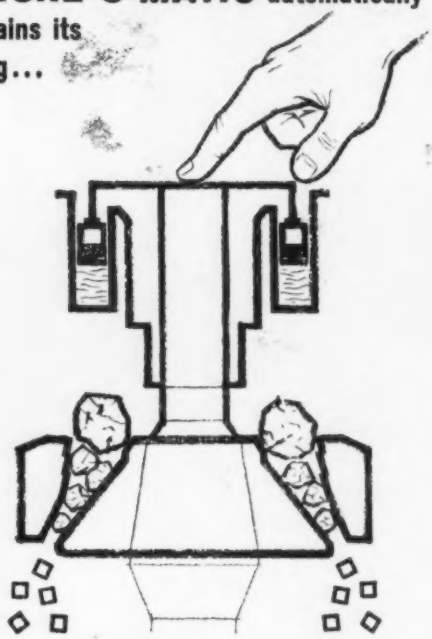
It is hydraulic...



It has the main shaft suspended from multiple hydraulic cylinders located above the spider—the logical location, not under the shaft in an inaccessible location.

Hydraulic crushers are not new, of course, but KENNEDY has carried the hydraulic idea to its logical next step.

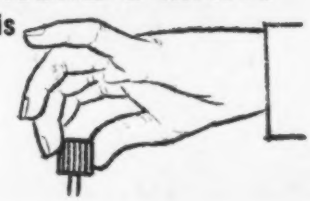
The *KONE-O-MATIC automatically maintains its setting...**



This is the single most important development in crusher design since the introduction of the reduction crusher itself. We call it POSITROL. It is a device which sensitively "feels" the setting at which the crusher is operating and automatically corrects any variations from this setting. With other hydraulic crushers it is necessary for the operator to frequently readjust the setting to compensate for leakage of oil past the hydraulic piston.

POSITROL also permits tramp iron to be passed by the machine without damage, after which it returns to its setting hydraulically.

Adjustment of the *KONE-O-MATIC* for a new setting is simple and foolproof...



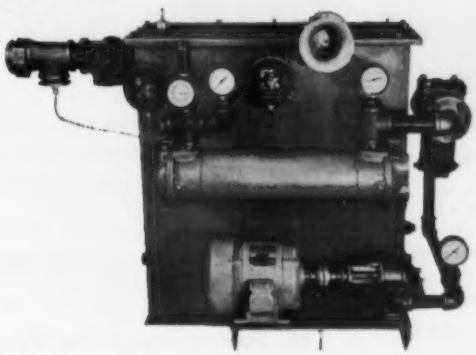
* (Patented & Patents Pending)

outstanding importance

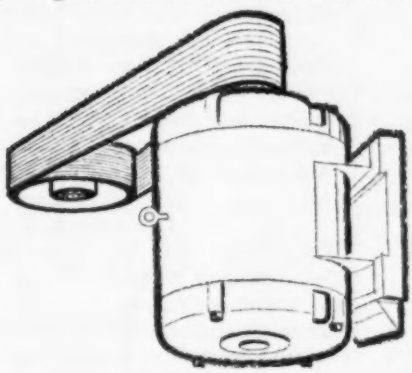
What's more it can be done while the machine continues to operate.

There are many other features of this remarkable new machine which make it unique:

It has a lubrication system of the most advanced design. Oil is forced under pressure through all vital points of the machine and is returned to the oil conditioning unit where it is filtered and cooled. For safety, an alarm is provided which instantly warns of low pressure or high temperature.

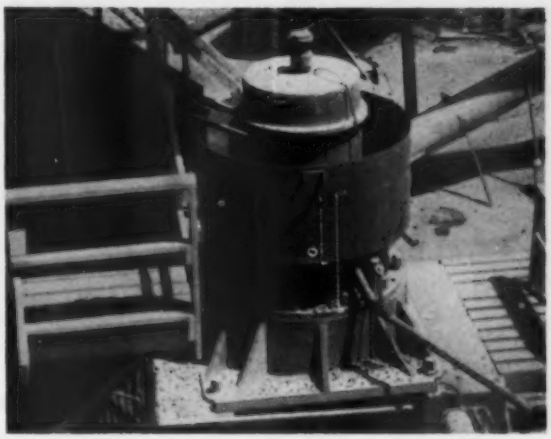


It has a gearless drive which is supported on roller bearings. More power is used for crushing —less for drive friction. There are no gears requiring lubrication and maintenance.



It has eccentric bearings equipped with renewable, precision-machined, non-score bronze liners.

It has a crushing mantle that is precision-machined for installation on the shaft without the use of zinc. Both mantle and bowl liner are ground to contour, permitting close adjustment.



This new advanced machine is now available in a complete range of sizes from 10 tons per hour to 1000 tons per hour.

For further technical particulars concerning the *KONE-O-MATIC* write for Bulletin KOM-61 or ask for a KVS representative to call.

KVS

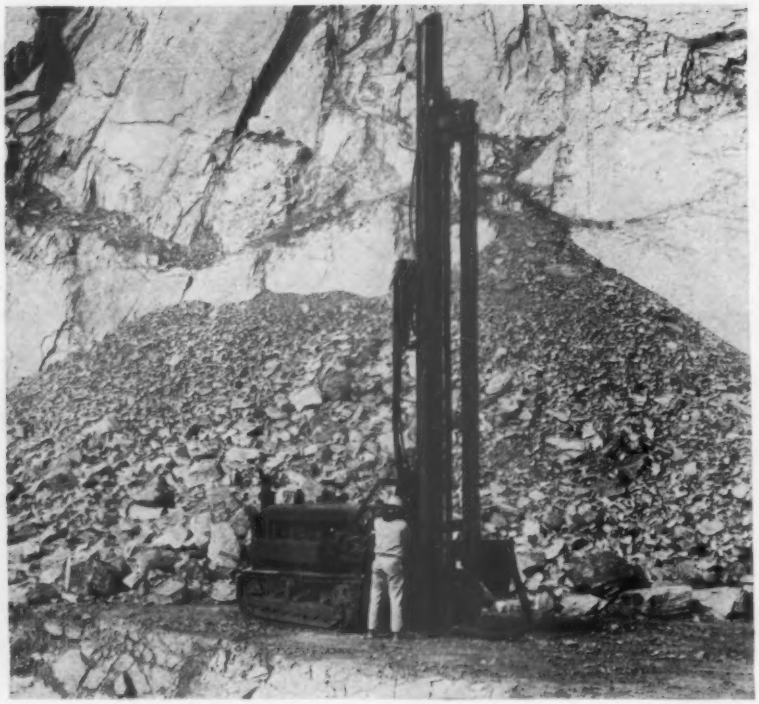
KENNEDY VAN SAUN

MANUFACTURING & ENGINEERING CORPORATION

405 PARK AVENUE, NEW YORK 22, N.Y. • FACTORY: DANVILLE, PA.

KENNEDY RESEARCH AND TESTING SERVICE

PRIMARY & SECONDARY GYRATORY CRUSHERS • JAW CRUSHERS • ROLL CRUSHERS • IMPACT BREAKERS • HAMMER MILLS
ROD & BALL MILLS • KILNS • DRYERS • SCREENS • CONVEYORS • COMPLETE CRUSHING, LIME AND CEMENT PLANTS.



Here's how to chip away at those High Operating Costs...

BUILD A TASK FORCE OF SCHRAMM CO-ORDINATED AIR-POWER

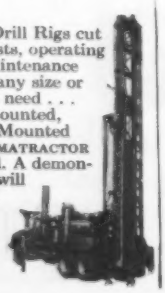
SCHRAMM ROTADRILLS are gluttons for work . . . and the result is up to two-thirds savings in drilling costs. ROTADRILL is self-propelled, sets up easily, ready to go in minutes. Furnishes its own air for rapid chip removal, dewatering and blockage breaking. Lazy-Susan pipe-rack holder makes changes faster, safer. One man can move the machine, drill, change steels, without assistance.

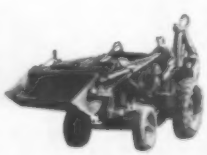
SCHRAMM has designed an entire line of air equipment to give more total work capacity in fewer units. ROTADRILL is just one example. A good hard look at your whole air-power picture will reveal many areas where old, bulky, inefficient equipment simply cannot give you competitive performance. Plan now to build a task force of modern, SCHRAMM air-power equipment.

Why not arrange for a demonstration at your SCHRAMM dealer's or write for full information on the benefits of co-ordinated air power. SCHRAMM, Inc., 640 North Garfield Ave., West Chester, Pa.

SCHRAMM
CO-ORDINATED AIR POWER

Rotadrill
Rotary Drill Rigs cut initial costs, operating costs, maintenance costs on any size or type you need . . . Truck Mounted, Crawler Mounted or PNEUMATRACTOR Mounted. A demonstration will prove it!





Pneumatractor **Self-propelled Compressors** cost less than comparable compressors and tractors combined! PNEUMATRACTORS drive along with work. No trucks, crews tied up.

Portable Compressors save you up to 35% initial cost on 125 cfm compressors, comparable savings on every size from 20 cfm to 600. You also save 15 to 50% fuel consumption.

Enter 162 on card, page 169

Drott Manufacturing Corporation, Milwaukee, Wis., has appointed JOHN HARDING as their district representative in New Mexico, Colorado, Utah, Wyoming, Idaho and parts of Montana and Nebraska. Mr. Harding, working out of Denver, Colo., will represent Drott in their construction equipment division. He comes to the company with several years experience in the construction field, and as a distributor sales representative.

J. Harding

H. A. Scribner

DONALD V. BUTTENHEIM, president of the Construction Industry Manufacturers Assn., has announced the appointment of HARVEY A. SCRIBNER as co-chairman of the publicity committee for the Construction Equipment Manufacturers Exposition and Road Show.

Mr. Scribner is president of Russell T. Gray, Inc., Chicago, an industrial advertising agency. Having served many times as a member of the publicity committee for previous Road Shows, and twice as chairman of the publicity committee, he brings experience and background to the promotion of this great Exhibit.

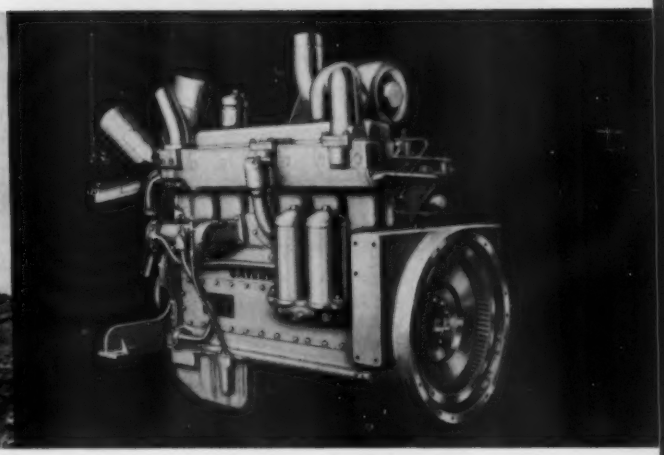
The Construction Equipment Exposition and Road Show is to be held under the sponsorship of the American Road Builders Assn., the Associated General Contractors of America, the International Road Federation, and the Associated Equipment Distributors. It will be presented and staged at the International Amphitheatre in Chicago by the Construction Industry Manufacturers Assn. in Feb., 1963.

JOHN D. ZURCHER has been appointed general sales manager of Kensington Steel Division of Poor & Company. Mr. Zurcher was formerly a sales engineer of Kensington Steel at its New York office.

Enter 163 on card, page 169 →

NEW CAT NO. 14 SERIES C MOTOR GRADER

Compact engine plus many other refinements assure top performance, easier servicing, long life



Important changes make up the new Series C No. 14 Motor Grader—big improvements throughout to give you better performance, long life and servicing ease:

NEW COMPACT 150 HP ENGINE The short, rigid block and stress-relieved crankshaft give greater strength and shock resistance. New cylinder head design resists distortion yet has superior cooling characteristics. Large water pump with cast-iron impeller, ceramic seal face, and carbon type seal combined with a 20 per cent increase in radiator capacity improves cooling, lengthens life.

NEW STARTING ENGINE All-weather starting with this new two-cylinder vertical gasoline engine is assured. Replacing the horizontal engine, this design features aluminum pistons and overhead valves for improved performance. Bore is 2.38″, stroke is 2.38″, and compression ratio is 8:1. Over-running clutch in starter pinion prevents damage to starter engine when diesel starts, a year-round starting plus.

NEW SERVICING EASE An advanced fuel system is designed for easier servicing and more efficient operation. Compact fuel injection pumps with barrel and plunger assemblies enclosed in housing help reduce wear, lengthen service life.

Plus all the features that made the No. 14B the most versatile motor grader in the "big machine" field . . .

EXCLUSIVE OIL CLUTCH —provides up to 2000 hours of service without adjustment, equal to about a year of "adjustment-free" operation.

DRY-TYPE AIR CLEANER —removes 99.8 per cent of all dirt from intake air. Can be serviced in five minutes.

MECHANICAL CONTROLS —provide easy engagement. "Anti-creep" lock makes blade stay put under load.

FULL VISIBILITY —operator has unobstructed view of job even while seated.

Now, all Cat Motor Graders feature the compact engine. Like the new No. 14C, the 85 HP No. 112E, the 100 HP No. 112F, and the 115 HP No. 12E are all designed to give you the highest production at the lowest possible cost. Your Caterpillar Dealer can give you the facts and figures. He can prove it both on paper and on your job. Call him today.

Caterpillar Tractor Co., General Offices, Peoria, Ill., U.S.A.

CATERPILLAR

Caterpillar and Cat are Registered Trademarks of Caterpillar Tractor Co.

THE NEW NO. 14C MOTOR GRADER— MADE FOR THE BIG JOBS

JAMES F. DONNELLY JR. has been appointed to the position of manager of advertising and sales promotion for the Permaglas division of A. O. Smith Corporation, Kankakee, Ill. Mr. Donnelly joined A. O. Smith in 1952 at the company's Milwaukee headquarters. He moved to the Permaglas division in 1956 as project coordinator and became supervisor of sales promotion in 1959.

Koehring Company's 1960 Construction Equipment Show for distributors and users of equipment was held in September at the Koehring proving grounds located seven miles west of Waukesha, Wis., on U. S. Highway 18.

For four days, some 40 construction machines were put through their paces in a variety of demonstrations and displays for the visitors. Among feature attractions were a complete highway paving setup including Koehring Division's very large Tribatch paver machine, a truck crane with a 200-ft. tubular boom, a new front-end loader attachment for the Kwik-Mix Hi-Lifter, a Parsons 420 cross-country pipe line trenching machine, a new mobile Johnson concrete batching plant, a new all-hydraulic Shawnee backhoe, and a variety of other excavating, spreading, compacting, lifting, drilling, and boring machines.

Cooperating in presenting the Koehring 1960 show were these company divisions: Buffalo-Springfield Company, Springfield, Ohio; Flaherty Manufacturing, Pocatello, Idaho; C. S. Johnson Company, Champaign, Ill.; Koehring Division and Koehring Export Division, Milwaukee, Wisc.; Koehring-Waterous, Ltd., Brantford, Ont., Can.; Kwik-Mix Company and KA-MO Tools, Port Washington, Wis.; Parsons Company and Shawnee Manufacturing, Newton, Iowa.

ADDISION M. SMITH, cost analyst for the western operations of Bemis Bro. Bag Company, has been appointed assistant to the president of the company. Mr. Smith will move from the Bemis western operations headquarters in San Mateo, Calif. to the office of the president in Minneapolis, Minn.

Including his years of service with the Jaite Company, St. Helens, Ore., which was acquired by Bemis in 1941, Mr. Smith has had more than 25 years of service with the company. He was office manager for Bemis in St. Helens and in Vancouver, Wash. before becoming western operations cost analyst in 1956.

Link-Belt Company has announced general managers for three of its plants. T. WEBSTER MATCHETT, former manager of the Caldwell plant in Chicago, has been appointed general manager of the Pershing Road plant in Chicago. He is succeeded at the Caldwell plant by GEORGE RAMSDEN, general manager of the North Central Division in Minneapolis.

Mr. Ramsden is succeeded in Minneapolis by GERALD A. STONE, former district manager of the Dallas office and factory branch store.

The appointments were effective September 15.

Joy Manufacturing Company announces the appointment of C. A. PATTEN as works manager of its New Philadelphia, Ohio plant. He will be responsible for all plant activities in the manufacture of Joy Axivane fans and conveyors. Mr. Patten had been manufacturing manager of Joy's plants in Franklin, Pa., since 1958.

JACK K. ADAMS, formerly chief industrial engineer for the company, replaces Mr. Patten as manufacturing manager, Franklin plants, responsible for the production of Jay continuous miners, shuttle cars, and loaders.

Gardner-Denver Company has moved into its new Chicago area office at 2535 S. 25th Ave., Broadview, Ill., just south of the Congress Expressway. The new 9,800-sq. ft. building with 1,800 sq. ft. of space available for parts, will serve as Gardner-Denver's District 5 headquarters. L. P. HANSEN is district manager. PETE DALEY is office manager. The company's previous district location was at 200 W. Fulton St., Chicago, Ill.

An experimental tractor, the first vehicle powered by self-contained and controlled fuel cells, was recently presented to the Smithsonian Institute, Washington, D. C., by Allis-Chalmers Manufacturing Company, Milwaukee, Wis.

Allis-Chalmers demonstrated its fuel cell-powered vehicle for the first time a little more than a year ago. In demonstration, it developed more than 3,000-lb. of drawbar pull, enough to pull a multiple-bottom plow. The electricity came from 1,008 individual cells.

A mixture of fuel gases and oxygen was fed into the cells. Within the cells, the gases reacted with an electrolyte aided by catalysts. The chemical reactions within the cells caused a direct current to flow through an external circuit to a 20-hp. Allis-Chalmers electric motor.

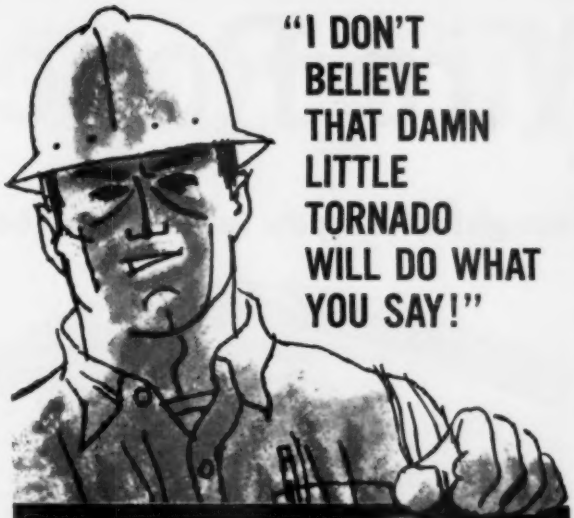
R. B. HAZARD, vice-president and sales manager rubber and packings, Raybestos-Manhattan, Incorporated, was elected director of the corporation at the directors meeting held in October.

Mr. Hazard began with Raybestos-Manhattan in 1945 as sales representative at Minneapolis, Minn. After serving in several sales managerial capacities, he was appointed vice-president and sales manager rubber and packings in 1956.

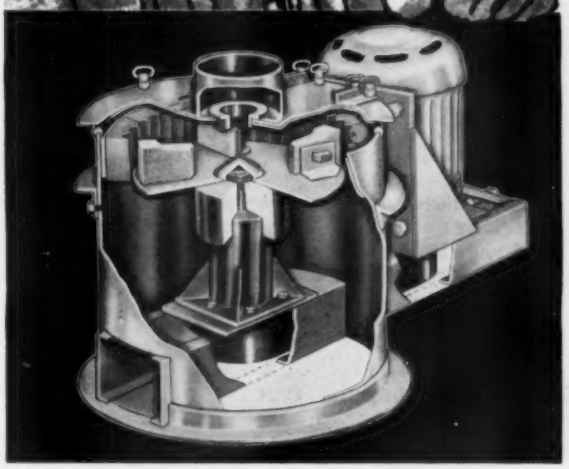
Three new appointments have been announced by the Explosives Department of Hercules Powder Company. THOMAS E. BROWN has been appointed assistant director of sales. He joined the company as a chemist in 1939 and since 1940 he has served the Explosives Department in production and sales. He has been manager of the Pittsburgh district since 1956.

ROBERT F. KELLEHER has been appointed manager of the Pittsburgh district. Mr. Kelleher joined the company in 1952 as a sales-service trainee. He has been assistant manager, Pittsburgh district, since 1959.

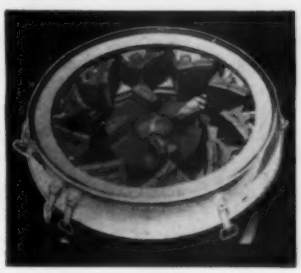
ROBERT J. SHIEL has been promoted to assistant manager of the district. He joined Hercules in 1955 as a sales-service trainee. Prior to his new appointment, he had been technical sales service representative in the Pittsburgh district.



"I DON'T BELIEVE THAT DAMN LITTLE TORNADO WILL DO WHAT YOU SAY!"



We don't blame you one bit if that's YOUR reaction to the claims we make for the Tornado Square Impact Crusher. Most people feel that way at first—and some of them express their doubts in even stronger language.



But seeing is believing. So you are invited to SEE FOR YOURSELF that the "damn little Tornado" will turn out an almost unbelievable number of tons per hour of a dense graded cubical product at a cost FAR below any other type of crusher!

Amazingly versatile—easy and cheap to maintain—virtually no "down time." Light in weight, no massive foundation needed. Low power requirement. No zincing or babbitting or other nuisances.

Write, wire or phone collect. We'll run a sample of your own material through the Tornado to PROVE how much it will do for you.

TOM BRIDGEWATER

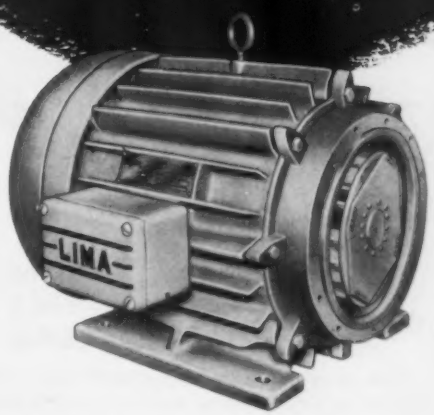
WERCO Steel Company

2151 East 83rd Street, Chicago 17, Ill.
Phone ESsex 5-8446
Cable Address, IMPACTOR

Enter 165-A on card, page 169

WHY

buy more generator than you really need?



Why buy a 100 KW generator to start a 50 HP motor when a LIMA 50 KW generator will start a 50 HP motor with a standard magnetic across-the-line starter. Brushless, inherent regulation ±5% . . . no external controls.

Single or 2 Bearing
Totally Enclosed Fan-Cooled
(Keeps out dust, grit and foreign matter)
. . . or, Dripproof
3 KW thru 150 KW, 1200 or 1800 RPM

for additional information write:
Darrel Bryan,
generator sales manager

LIMA

- ELECTRIC MOTORS
- GEARSHIFT DRIVES
- VARIABLE SPEED DRIVES
- GEARMOTORS
- STRAIGHT LINE REDUCERS
- SHAFT MOUNT REDUCERS
- GENERATORS

A Member of The Cordec Group

THE LIMA ELECTRIC MOTOR CO., INC.
LIMA, OHIO

Enter 165-B on card, page 169

Union Wire Rope

Super strong! Super tough! Gives you fullest measure

Mangled in a Wedge Socket

Here's a result of improper socketing. It was caused by using a poorly designed or worn-out wedge socket. Failure at the dead end can damage other sections of the rope, too.

Rusty Road to Ruin

Rust—No. 1 enemy of steel—takes a heavy toll in wire rope life. An insidious, silent type of killer, rust often does irreparable damage before it's even noticed. The one-strand break shown here resulted when the rope was allowed to become rust-bound through lack of lubrication. Tests show that, with other conditions ideal, properly lubricated rope has up to 10 times the life expectancy of dry rope.

Union Tuffy's on the job • Some of the popular types and uses

Tuffy Scraper Rope

Flexible enough to take sharp bends; stiff enough to resist looping and kinking when slack; highly resistant to the shock of load impact — that's Tuffy balanced construction. Mount a reel on your scraper—save wasting sound rope.

Tuffy Slings and Hoist Lines

Slings are a patented, 9-part machine-braided wire fabric that is next to impossible to knot or kink. Hoist lines have built-in strength, toughness, flexibility. Balanced—a top-performing team for handling every type of material. In addition to Tuffy, Union Wire Rope furnishes a complete line of slings.

Tuffy Dozer Rope

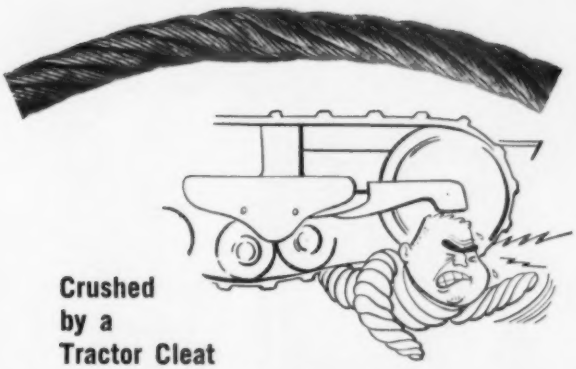
Mounts right on your dozer in a 150′ reel. When rope shows wear, just feed through enough to replace the damaged part. Saves rope, gives you a bonus of extra service. Also available in 300′ and 500′ reels.

Union's Field Organization Will Help Select the exact rope you need from the Tuffy family of wire rope and slings tailored to special needs and from more than 1600 standard constructions. All have the balanced strength, toughness and flexibility that add up to long, trouble-free service. If your rope need is new, even more specialized, you are invited to bring your case to our research laboratory. That's the way many of today's special purpose constructions were developed. No obligation. Call your Union Distributor—listed in phone book Yellow Pages.

Tuffy® Tips

New steels are born at Armco

of service life when properly used . . . not abused . . .

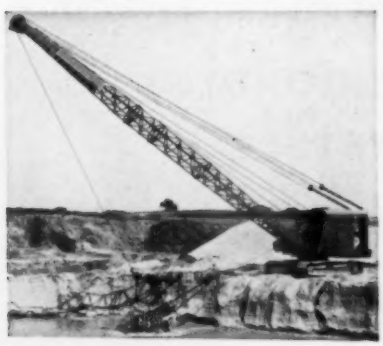


Crushed by a Tractor Cleat

The Sunday punch for this piece of wire rope was delivered by a tractor cleat—just one of many crushing injuries caused by rope being run over or banged into by hard, sharp objects. Even the toughest wire rope is no match for this kind of mistreatment.

After a Suicide Jump

This rope jumped out of sheave and was soon destroyed by pulling around the shaft. Actually, it was a case of sudden slack which threw the rope out of the sheave.

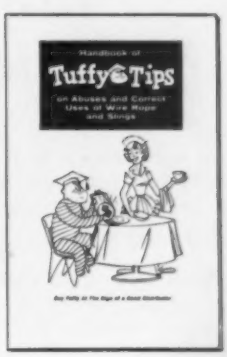


Tuffy Dragline Rope

High abrasive resistance and super flexibility. Gives long service, dependable action in handling any material—wet or dry dirt, sand, gravel, rock, minerals. Rides smoothly on grooves—hugs the drum when casting for full load.

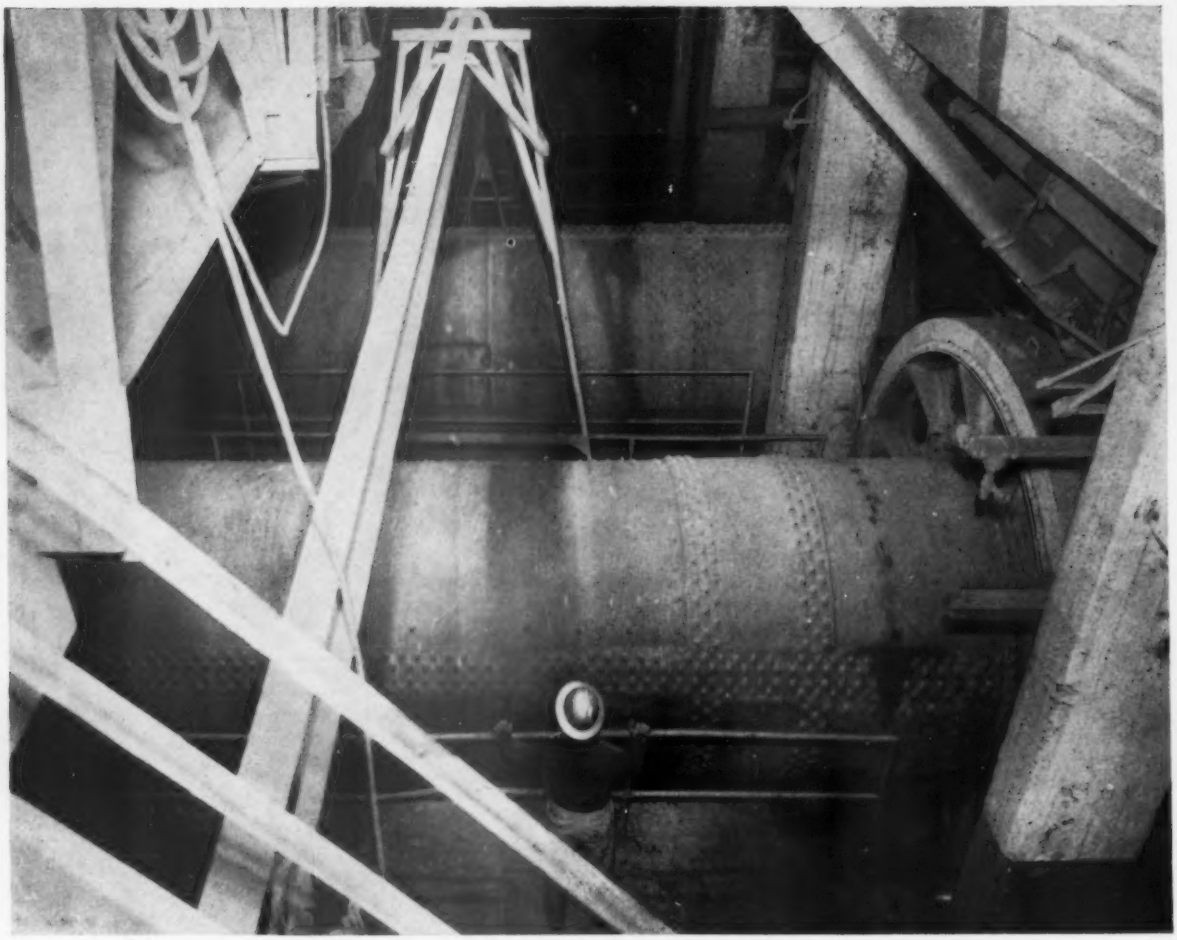
Union Wire Rope Handbook of TUFFY TIPS . . . Free!

The "Tuffy Tips" shown here are quoted right out of Union's handbook. In it there are dozens of other priceless hints on the correct use of wire rope. The common abuses and how to avoid them. How to save costly injuries. Maintenance tips. The proper fittings and how to apply them. Recommended sizes. Many other facts and suggestions that will cut down your rope costs and help you get out of wire rope the full service we build into it. No charge. Write Union Wire Rope, Armco Steel Corporation, 2132 Manchester Ave., Kansas City 26, Missouri.



1-61

ARMCO Union Wire Rope



Ni-Hard mill liners save dollars for cement-plant operators

Twelve years ago a large cement company installed Ni-Hard* nickel-chromium white iron liners in their No. 2 dry-grinding mill.†

They are *still* in excellent shape.

What's more, the plant estimates that they're good for at least *another* 10 or 12 years' service. So it's no wonder they've put Ni-Hard liners into two more mills!

High Abrasion Resistance

Try Ni-Hard iron alloy in *your* mills. It is unlike other cast irons. Not only is its structure as hard as that of fully hardened steel, but it contains firmly embedded hard carbides which help to make it *one of the most abrasion-resistant cast products commercially available to you.*

Ni-Hard liners often double or triple the interval between mill relinings. And Ni-Hard liners often hold their original contour right down to the last quarter-inch!

Minimize Needless Shutdowns

Next time you reline a mill, try this nickel-chromium white iron. Ni-Hard liners can be produced in practically any design to meet your individual grinding requirements. And segments can be fastened by any commonly used method. Try a set and see for yourself how they give you maximum abrasion resistance at lowest ultimate cost.

Valuable Booklet Tells More

Every plant operator who ever faces an abrasion problem should have a copy of *"Engineering Properties and Applications of Ni-Hard."* This 60-page, illustrated booklet gives you all the facts about Ni-Hard iron performance and suggests where and how to use it for best results. We'll send a copy on request. But for really fast action, just get on the phone and call your local Ni-Hard producer. (If you don't know his name, ask us.) He'll answer your every question about long-wearing, abrasion-resisting Ni-Hard iron.

*Registered trademark
†Name and details supplied upon request.

THE INTERNATIONAL NICKEL COMPANY, INC.
67 Wall Street INCO New York 5, N. Y.

NI-HARD

NICKEL MAKES ALLOYS PERFORM BETTER LONGER

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

THE 150-PAGE SCREW CONVEYOR ENGINEERING GUIDE from *Thomas Conveyor Co.* is available free to qualified personnel. It contains sections on engineering, components, and layouts. Several pages are given to typical installations. **(301)**

VIBROLATOR VIBRATION INDUCERS—air, steam, hydraulic, electric and gasoline—are set forth in a folder released by *Martin Engineering Company.* Specifications, capacities, and applications are listed. **(302)**

A PNEUMATIC-MECHANICAL DISCHARGE transport for cement and similar free flowing material is described in a folder released by *Baughman Manufacturing Company.* The unit, PMCT-1, can unload up to 1,300 lb. per minute by air, and up to 2,000 lb. per minute mechanically. The company has other units for special requirements. **(303)**

NEW TWO-WAY RADIO equipment is described in a series of bulletins released by *General Electric Company.* Information is supplied on mobile communication units with transistor power supplies and with vibrator-dynamotor supplies. **(304)**

SERIES "350" BANTAM CRANE-EXCAVATORS are detailed in a newly revised 12-page specification bulletin published by the *Schield Bantam Company.* Capacity charts, work ranges and features for the 11-ton carrier-mounted Model T-350, the 11-ton self-propelled Model CR-350, and the 8-ton Model C-350 crawler-mounted Bantam, as well as the complete line of front-end attachments, are given. Features and specifications for the six Bantam crane carriers and other mountings are shown also. **(305)**

A PORTABLE CONVEYOR AND A PORTABLE SCREENING PLANT are illustrated and described in a folder released by *E. F. Marsh Engineering Company.* A table of conveyor lengths in combination with a single deck screen and a 5-cu. yd. capacity hopper is given for the Marco® engineered units. A table of capacities is included. **(306)**

THE KRAFTPACKER, AUTOMATIC OPEN-MOUTH BAG FILLING machine that reportedly will bag 400 to 500 tons of free-flowing materials in an 8-hr. day with close accuracy is described in a brochure released by the *Kraft Bag Corporation.* **(307)**

MODULAR DESIGN FEATURES OF RECORDERS AND INDICATORS of the ElectroniK line manufactured by *Minneapolis-Honeywell Regulator Company* are set forth in the new 48-page catalog, C 15-1a. The quick changing 2 to 24 point Universal Multipoint recorder, as well as strip and circular chart recorders and precision indicators are included. **(308)**

UNIT (BIN) VIBRATORS for handlers of all types of bulk materials are listed in a 6-page folder available from *Eriez Manufacturing Company.* The complete line consists of nine models. All units are a.c., need no rectifiers and all provide pinpointed vibration for hoppers, bins, and chutes. Two of the larger units produce a double impact because the hammer strikes the anvil on both top and bottom of the stroke, giving 7,200 impacts per minute. Complete dimensions and capacities are listed for the line. **(309)**

THE HYDROTARDER, AN INDEPENDENT AUXILIARY BRAKING AND SPEED arresting system, developed by *Parkersburg Rig & Reel Company,* is described in a pamphlet as the most efficient system for dissipating surplus energy that has been developed. As its power absorption ability depends upon motion and fluid, it does not bring equipment to a full stop, but does provide smoothly regulated speed control independently of the regular brakes. In its operation the maximum resistance the Hydrotarder offers a moving load varies as the cube of approximately its driven speed. **(310)**

FEBRUARY **PIT AND QUARRY** **1961**

Insert key numbers found below items on advertising, literature, and new equipment pages. Print company name if not keyed.

Void after 60 days.

_____ _____ _____ _____ _____ _____

_____ _____ _____ _____ _____ _____

Name _____ Title _____

Company _____

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We produce_____

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CHICAGO 5, ILL., U.S.A.

more information, please

Use postcard to receive literature or details on new equipment and products reported in this issue.

AN AUTOMATIC FAN DRIVE developed for heavy duty International V-8 truck engines is described in a folder released by the motor truck division of *International Harvester Company.* According to International, as much as 12 percent of usable engine horsepower can be freed, and up to 10 percent in fuel savings can be made. **(311)**

THE GRIZZLY FEEDER LINE—natural frequency vibrating—of the *Carrier Division, Chain Belt Company,* is described in the new 8-page bulletin, No. C900P. According to the manufacturer the feeders, designed for processing stone and ore, are used with crusher or hammer mill operations to feed rock of any size at uniform rates, distribute material evenly across the opening for uniform crusher wear, scalp fines to prevent crusher jamming, and control capacity automatically for best crusher efficiency. The Carrier Grizzly remote control system is also outlined. **(312)**

"MODERN, PROFITABLE MINING METHODS with the Eimco 630 Crawler Series," a 14-page booklet published by *The Eimco Corporation,* outlines the capacities of the various units, lists available accessories and attachments, and pictures the equipment at work. **(313)**

WEAR-ARRESTING LUBRICATION as provided by Almasol is described in an 8-page brochure available from the manufacturer, *Lubrication Engineers, Inc.* The Almasol line includes the following: (1) 607-608 - gear lubricants for transmissions, etc.; (2) 1225 - chassis and bearing lubricant; (3) 450 - track roller lubricant; (4) 1250 - high temperature lubricant — an inorganic, nonmelting product designed for use in kilns, ovens, and other extra high temperature applications. Another brochure available from the same company explains how the laminar-lattice structure of Almasol achieves greater lubricity. **(314)**

SAFETY IN TERMS OF THE WORKER'S ADVANTAGE is sold in a 12-page, 4-color pamphlet, "The Big Payoff," published by the *National Safety Council.* The booklet lists the effects of accidents on the worker and his family, and shows how he is the winner when he takes an active part in a safety program. Sprightly cartoons, in keeping with the direct approach of the text, illustrate the booklet. Cost, $0.09 each in lots of 50. The booklets are available from the National Safety Council, 425 N. Michigan Ave., Chicago 11, Ill. **(315)**

"VEST POCKET GUIDE TO BETTER WELDS," published by *Hobart Brothers Company,* contains 50 pages of arc-welding information. The booklet includes such data as five essentials for proper welding procedures, operator qualifications, examples of good and bad welds, causes and cures of common welding problems, and welding training aids. **(316)**

JALLOY-S AND JALLOY-AR, TWO NEW ALLOY STEELS, are described in two new brochures published by *Jones & Laughlin Steel Corporation.* Tables list chemical and mechanical properties of the steels—Jalloy-S, the construction series, and Jalloy-AR, the abrasion-resistant series—plus selected engineering information. The text covers major considerations in using and fabricating the new steels. **(317)**

A WORK GLOVE SELECTOR manual compiled by the Glove Division of the *Riegel Textile Corporation* covers basic styles and types of work gloves, and gives specification details. Tips on grades of leather, chemical resistance, and physical properties of plastic coatings are given. Basic features of other glove materials are also covered. A second section contains on-the-job case histories. **(318)**

Material listed here is FREE unless otherwise noted.

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NEW SUBSCRIPTION ORDER FORM

Send PIT AND QUARRY to me for

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____Payment enclosed ____Bill me ____Bill company

Name _____ Title _____

Company _____

Address _____

City _____ Zone_____ State_____

Type of business
and products _____

***U. S., U. S. Possessions, and Canada only.**

Pan American countries, $10 a year; elsewhere, $15 a year.

"Surpassed all expectations as a rock shovel"

says Riverview Stone & Material Company

As one of the leading producers in their area, Riverview Stone & Material Company in Florissant, Missouri, has earned a lot of respect for their efficient operating methods. The fact that they recently made the switch to AMERICAN — and enthusiastically endorse its performance — speaks for itself. It's another example of leading pits and quarries who are re-evaluating today's rock shovels, and moving up to AMERICAN.

Make your own investigation . . . you'll see why. Compare AMERICAN's rugged alloy steel crawler base . . . bigger, cooler-running brakes and clutches . . . anti-friction bearings on all constantly turning shafts . . . roomy machinery deck . . . simplified lubrication and maintenance. You'll find that shovel values have changed over the years. That's why it will pay you to get the up-to-date story on AMERICAN before you buy. 5-706

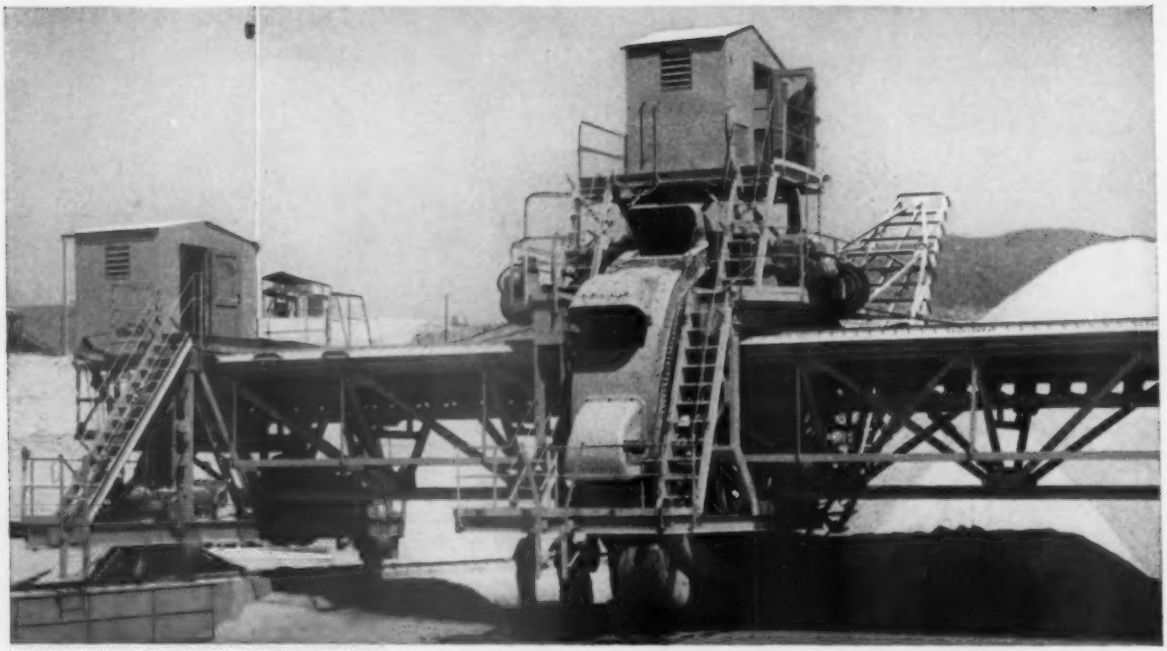
AMERICAN

AMERICAN HOIST and DERRICK COMPANY
ST. PAUL 7, MINNESOTA

SHOVELS ½ TO 4½ YDS

CLAMSHELLS—DRAGLINES

CROSBY-LAUGHLIN DIV.
Forged fittings for
wire rope and chain



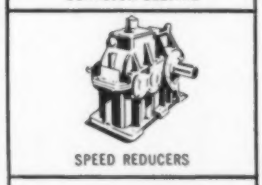
BIG WHEEL

It blends... it reclaims... it ends inefficiencies of selective mining

As part of a new H-R Rotary Bucket Wheel Blending and Reclaiming System, this giant 3-story wheel is capable of processing efficiently a broad range of materials . . . especially where more than one of the following typical situations exist:

1. Engaged in selective mining
2. Unable to comply with specifications
3. Too much coarse or fine material in feed
4. Storage pile requirements range 50,000 tons and over
5. Two or more types of raw material to blend for chemical compounding.

For full details consult your H-R representative, or write Hewitt-Robins, Stamford, Connecticut. Ask for Bulletin 2-24.



HR HEWITT-ROBINS

THE NAME THAT MEANS EVERYTHING IN BULK MATERIALS HANDLING SYSTEMS...

CONVEYOR BELTING AND IDLERS • INDUSTRIAL HOSE • VIBRATING FEEDERS, SCREENS & SHAKEOUTS • POWER TRANSMISSION EQUIPMENT

Advertising rate per issue:

$11.50 per column inch. Lower rates for larger space used and/or on contract basis.

Write for rate card.

Closing date:

20th of month preceding date of publication.

Used equipment, employment and professional ads only are eligible for classified advertising rates.

PIT & QUARRY
431 S. Dearborn St. Chicago 5, Ill.

BROADCAST

Section

WANTED
MECHANICAL ENGINEER

Growth opportunity for graduate engineer with leading heavy machinery manufacturer in its New York City engineering office. Experience required in thermodynamic and mechanical problems relating especially to material reduction and burning equipment. Liberal company benefits. Salary open. Send resume, including education, experience and salary desired, to

Box No. PQ-108-B, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED
STONE BROKER OR SALESMAN

Northwestern Ohio location. Must be experienced in Fluxing and Ballast Stone Sales. Write giving complete details of age, experience, education, present earnings, etc., in first letter. Completely confidential. Personal interview arranged with qualified applicants.

Box No. PQ-106-B, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

WANTED

Qualified agents or dealers to sell modern line of washing and classification equipment to aggregate producers—Exclusive franchised territories available—Liberal return on a modest investment—Write, stating previous experience and desired territory, to

Box No. PQ-100-A, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Ill.

WANTED

Leading manufacturer of crushing cement and lime plant machinery requires service and erection representative. In reply give education, experience and salary required. All communications confidential.

Box No. PQ-109-B, c/o Pit and Quarry Publications
431 So. Dearborn St. Chicago 5, Illinois

SALESMEN

Well-established Cleveland Concern needs jobbers and representatives with diesel contacts preferred to sell camshaft re-building and crankshaft plating by exclusive Rotochrome process. Prefer man now calling on people who rebuild diesel engines for the oil industry. Excellent profit margin. Submit details, present lines handled.

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1—Raymond 50", 5-roller hi-side mill, Double whizzer separator

1—Symons 2' shorthead cone crusher

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CEDARAPIDS 3240 IMPACT PORTABLE PLANT #17824 w/12' apron feeder, vibr. grizzly, conveyor, GM diesel power, tandem rubber. **CEDARAPIDS 4033 HAMMERMILL SECONDARY PORTABLE** #17820 w/4x14 Screen, rotorator, two delivery conveyors, Twin GM diesel, tandem rubber. **CATERPILLAR** 75KW Generator Set, diesel. **JOY WAGON DRILL** on Ford Tractor. **LORAIN** L50K6 Shovel 1¼ cy. diesel, shear ball mounting. (3) **INTERNATIONAL** KB11 Trucks w/like new heavy duty Rock Beds. Crushing Plant, Shovel, Drill, all only 3 yrs. old, excellent condition, used soft limestone rock. $87,500 terms.

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CEDARAPIDS 3x12 Apron feeder w/hopper, clutch, good. $1850.

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Complete installation still intact at Sand Mine

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2 15-20 Ton EUCLIDS REAR DUMP

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50 Ton Open Top & 70 Ton Covered

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9—Ingersol-Rand, 3000', 2200', 1800' — 600'
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DIESEL LOCO CRANE
25-ton Industrial Brownhoist with D13000 Cat. diesel & 60 ft. boom

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7—25 ton, 4—45 ton, 1—65 ton, 1—80 ton, 2—100, 3—120 ton General Electric
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300—1½, 3, 5, 16 & 20 yds. cap.

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8" x 10", 10" x 36", 20" x 36", 24" x 36"

JAW CRUSHERS BLAKE TYPE
14" x 28", 30" x 36", 48" x 60", 48" x 72", 66" x 84"

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40" x 16", 54" x 24"
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2', 3', 4', 5½, 7 Symons Cone Crushers
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19⅛8 and 25⅛8 Kennedy Van Saun
No. 1 Sturtevant Rotary Fine
46" Stedman Double Cage Disintegrator—Unused

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2' x 6' Single Deck, 3' x 12' Single Deck, 5' x 12' Double Deck, 6' x 12' Double Deck

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3' x 30', 6' x 60', 7' x 120', 9' x 160'

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48" & 20" Traylor with motors
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4 x 9 and 5 x 8 Kennedy Van Saun Air Swept
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HARDINGE CONICAL BALL MILLS
3' x 8", 3' x 24" and 10' x 48"

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4' x 11' Ruth 6' x 12' EPD Hardinge
7' x 15' Marcy Open End 300 HP Motor

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24" x 18" Jeffrey Type A
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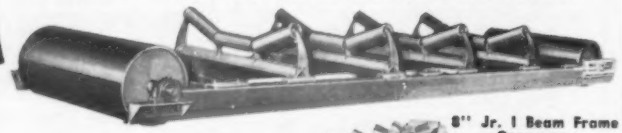
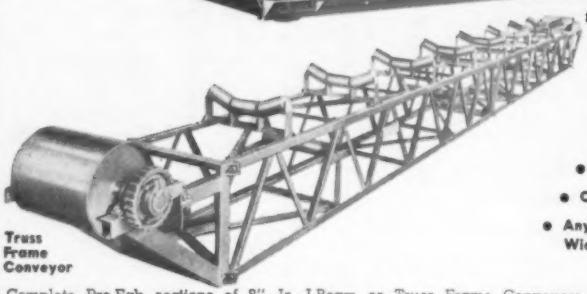


8" Jr. I Beam Frame Conveyor



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8" JR. I-BEAM CONVEYORS

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Belt Width	Conveyor Length	Sale Price	Add or Deduct Per Foot
14"	25'	$ 766	$16.62
16"	20'	700	
16"	45'	1,128	$17.10
18"	25'	830	
18"	45'	1,190	
18"	70'	1,641	$18.03
18"	85'	1,912	
18"	100'	2,182	
18"	130'	2,723	
18"	200'	3,983	
20"	25'	871	
20"	60'	1,546	
20"	75'	1,836	$19.30
20"	90'	2,125	
24"	25'	922	
24"	45'	1,335	
24"	70'	1,852	
24"	100'	2,473	$20.68
24"	120'	2,886	
24"	150'	3,507	
24"	200'	4,540	
30"	50'	1,591	
30"	70'	2,054	$23.17
30"	90'	2,518	
30"	100'	2,749	
36"	25'	1,105	
36"	45'	1,623	$25.91
36"	60'	2,012	
36"	100'	3,048	

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Sale Price	Add or Deduct Per Five Feet
$ 965	$109
975	
1,434	$112
1,104	
1,573	
2,159	$117.20
2,510	
2,862	
3,565	
5,206	
1,150	
2,017	
2,388	$123.81
2,759	
1,201	
1,723	
2,377	
3,160	$130.66
3,683	
4,467	
5,773	
2,018	
2,594	$144.18
3,171	
4,612	
1,886	
2,024	$157.64
2,497	
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- FAST ECONOMICAL HANDLING OF BULK MATERIAL
- AVAILABLE WITH SCREEN AND FEEDER
- RUGGED 30" DEEP TRUSS FRAME
- HIGH TONNAGE AT LOW COST
- EQUIPPED WITH TOW HITCH

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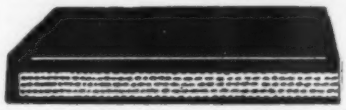
All belting is tested by the Engineering laboratory of one of the largest universities in the United States. It is guaranteed to meet or exceed listed specifications.

Other widths, plies, duck weights and cover thickness available at low prices.

WRITE FOR FREE SAMPLE & BULL. #1279



MAJOR BRAND: 12# to 15# Friction Pull. 800# to 1000# Cover Tensile. Heavy Duty, 28 oz. duck. 1/8" top x 1/32" bottom rubber covers. Tough cotton duck, strong carcass and proper flexibility. Used in moving boxes, bags, coal, sand, gravel, crushed stone, salt, earth and similar materials.

Width	Ply	U.S. Made Per Foot
14"	4	$3.06
16"	4	3.21
18"	4	3.56
20"	4	4.11
24"	4	4.61
30"	4	5.54
36"	4	6.69

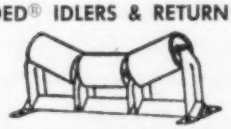
MAJOR BEE BRAND: 16# to 19# Friction Pull. 2400# to 3000# Cover Tensile. Skim Coat Between Plies. A high grade of heavy duty 28 oz. duck, 1/8" top x 1/32" bottom rubber covers. For severe service and abrasion resistance. For stone, mineral ores, concrete, cement and coal.

Width	Ply	U.S. Made Belt Per Foot	Special Imported Belt Per Foot
16"	4	$3.74	$3.23
18"	4	4.14	3.59
20"	4	4.72	4.15
24"	4	5.35	4.67
30"	4	6.56	5.75
24"	5	6.25	5.41

WRITE US FOR YOUR ELEVATOR BELT AND CHUTE LINING REQUIREMENTS

ELEVATOR BELT is of heavy duck carcass with smooth tough rubber or friction surface on one or both sides. Can be furnished with or without bucket holes punched and cemented. Write for full information and prices. **CHUTE LINING** is of high-tensile, abrasion-resisting quality. Recommended for Chute and Launder Lining, Conveyor Belt Scrapers, Conveyor Skirt Boards, Die-Press or Bumper Stock, Hoppers, Bins and other metal surfaces exposed to the action of abrasion materials.

BONDED® IDLERS & RETURN ROLLS



3-roll, 5" diameter Troughing Idlers for:

14" belt	$19.75	24" belt	$22.75
16" belt	20.50	30" belt	23.85
18" belt	21.90	36" belt	24.90
20" belt	22.10	48" belt	27.50

1-roll, 5" diameter Return Rolls for:

14" belt	$ 8.50	24" belt	$11.00
16" belt	9.00	30" belt	12.50
18" belt	9.50	36" belt	13.75
20" belt	10.00	48" belt	16.50

All steel. Interchangeable with other well-known makes. Furnished with replaceable prelubricated sealed ball bearings. Maintenance is negligible. **WRITE FOR BULLETIN #1138.**

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1—Allis Chalmers 9' x 130' Rotary Kiln ¾" shell.
1—Allis Chalmers 7' x 120' Rotary Kiln, ⅜" welded shell.
2—Allis Chalmers 7'6" x 7' x 125' Rotary Kilns.
1—Allis Chalmers 4' x 40' Rotary Kiln ⅜" shell.
1—Traylor 8' x 80' Rotary Dryer ⅝" shell.
1—Vulcan 8' x 80' Rotary Dryer ½" shell.
2—RotoLouvre Dryers 6'4" x 24'.
1—Rennenburg 6' x 50' Rotary Dryer ⅜" shell.
1—Louisville 6' x 48' Rotary Dryer, ⅜" shell, oil fired.
2—Bonnot 6' x 40' Rotary Dryers ½" shell.
3—Davis 6' x 25' Rotary Dryers ½" shell.
1—Ruggles Cole 5' x 30' Rotary Dryer ⅜" shell
1—Allis Chalmers 4' x 30' Rotary Dryer ⅜" shell.
1—3' x 36' Rotary Dryer ⅜" shell
1—34" x 30' Rotary Dryer 5/16" shell.

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1—Raymond #5057 Five Roll High Side Mill, 7' double whizzer separator.
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1—Penn. Super-Thor Hammermill, size SXT-13, 250 H.P.
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1—16' dia. Raymond Whizzer separator with 50 H.P. motor.
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36" x 140' 0" Conveyor To—
Two 48" x 14' 0" Triple Deck Horizontal Screens To—
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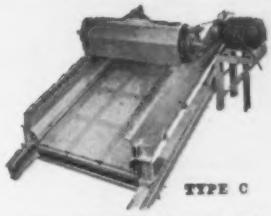
PROMPT SHIPMENT OF ALL MODELS

SPECIAL SERVICE SCREENS



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For scalping middle-range pieces and accurate sizing of fines but where quantity and feed do not warrant a larger capacity, heavy duty model. Medium to heavy construction. Can also be suspended from four steel cables and springs for portable or temporary installation. Vibration remains in working screen body. No shaking of tipple, building or platform. **Priced from $487**

WRITE FOR "SEVEN SECRETS OF SUCCESSFULSCREENING" IN BULL. 1086.

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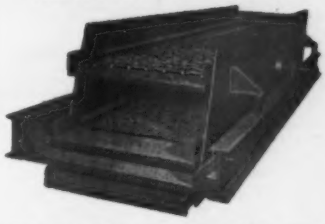

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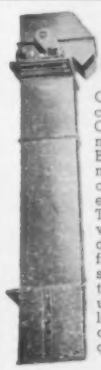

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1—Hardinge pilot size ball mill, 24"x8" complete.
1—Patterson rod mill, 4'x11'6"
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4 Row Disintegrator
Pulverizing Mill

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Mast	**— 95'**	**2 Sections**	**— 32' — 6"**
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30" x 42" Pioneer Jaw Crusher

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2—30"x42" Pioneer Roller Bearing Jaw Crusher. All welded steel frame. Manganese jaws, V-belt drive, 125 hp. Elliot TEFC motors. 440 V. Complete with Clark combination starter. Excellent Condition.

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5x13 Penna Hammermills, 400 HP
Heil Patterson Crusher, 100 HP
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100 Steel Tanks, 1000 to 350,000 gal.

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SPECIAL: Terratrac Model G-300 with backhoe

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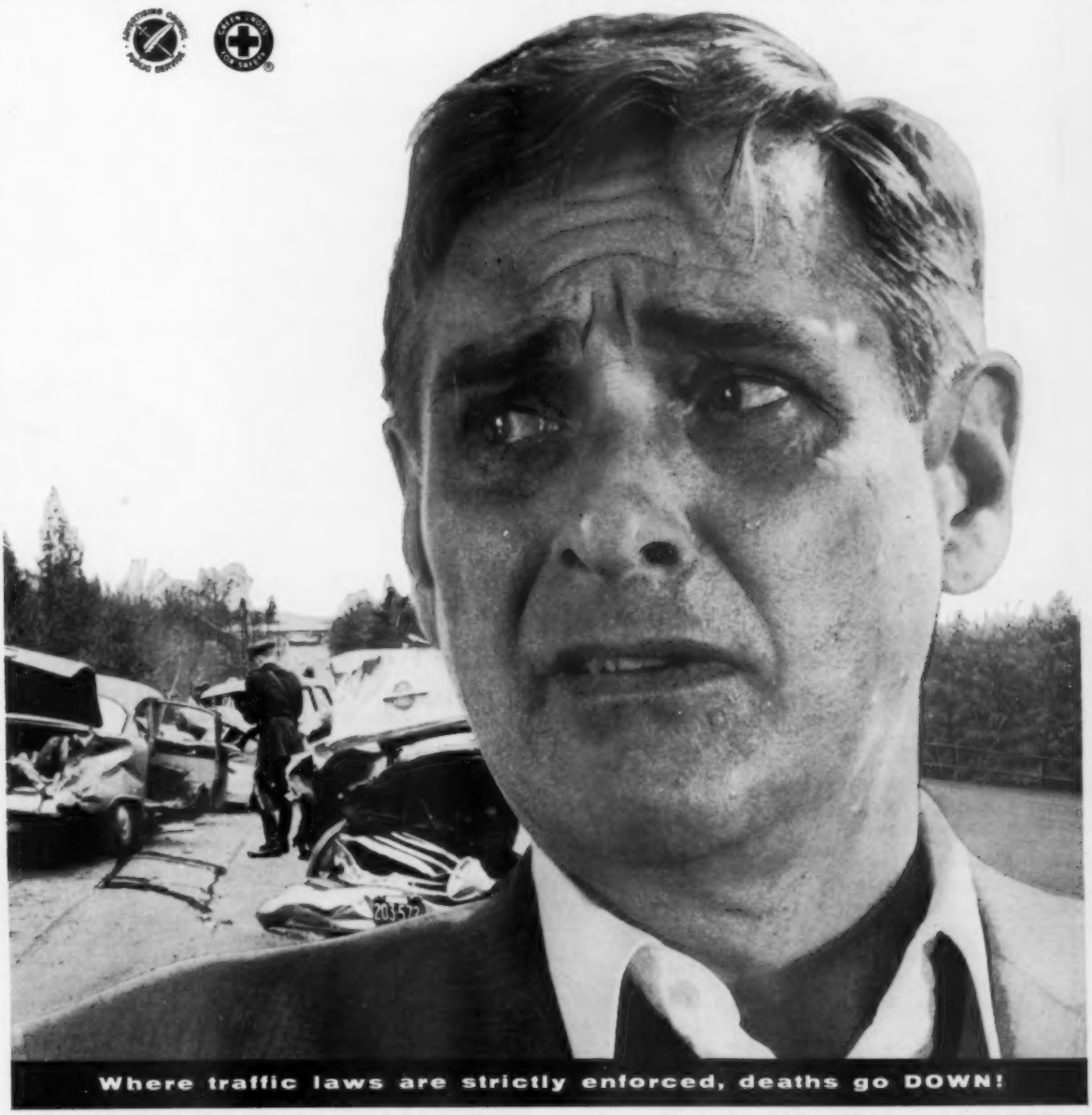

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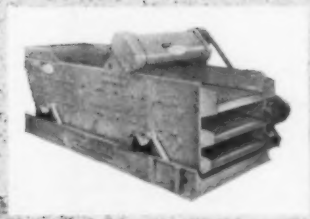

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Nothing is quicker or snappier than the air springs of a Universal Horizontal Screenmaster.

Metal fatigue in conventional leaf and coil springs causes sluggish, inefficient screening.

Universal air springs retain their smooth aggressiveness indefinitely, assuring efficient screening action.

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This unique combination of phasing bars and air springs assures a consistent high level of performance, resulting in *extra* production in all types of material.

For further details, contact your Universal Distributor. He will help you select the best size for your needs in either stationary or portable plants.

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CONTRACT CORE DRILLING

EXPLORATION FOR MINERAL DEPOSITS
INCLUDING URANIUM & LIMESTONE — ANYWHERE

FOUNDATION TEST BORING

GROUT HOLE DRILLING

Skilled crews and complete stock of core drills and accessory equipment maintained at all times

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Contract Core Drill Division
MICHIGAN CITY, INDIANA

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Earthmoving tools, brick augers, conveyors, mill guides	High abrasion; sliding friction	**VICTORITE**	Gas AC-DC Arc
Crushers, grinders, mixers, scrapers, fan and screw conveyors	Abrasion and impact	**TUBE VICTORITE**	Gas AC-DC Arc
Cement pumps, brick dies, dry bearings & journals, expellers	Heat; abrasion, corrosion	**VICTORITE 1**	Gas AC-DC Arc
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Dredge rolls, cable sheaves	Severe compression & impact with abrasion	VA 2X
Mill guides, crushers, grinders	Severe abrasion & compression with impact	VA 3
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Shovel rollers, tractor rollers & idlers	Severe metal-to-metal impact & abrasion	VA 5X
Build-up on mine car wheels & tractor rollers	Severe impact & compression with abrasion	VA 7X
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H-76

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Unit Pulverizes from 204 to 216 Tons Daily of Coal Containing as much as 12% Moisture

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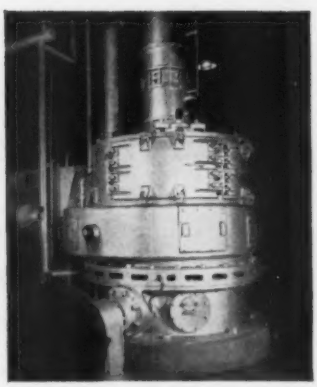

B&W EL Type Pulverizer at Marquette Cement Manufacturing Company has ground an average of over 72,000 tons per year since its installation. No unscheduled shut-downs required for maintenance.

C-220

B&W THE BABCOCK & WILCOX COMPANY

BOILER DIVISION

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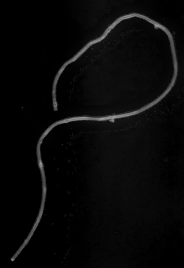
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